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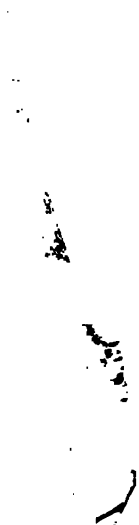
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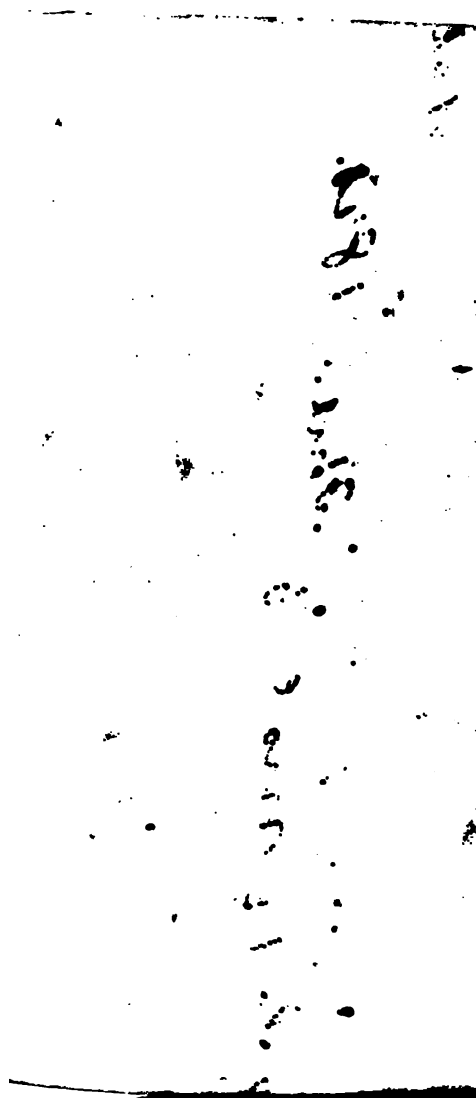








VIEW
OF THE
UNITED STATES.



VIEW
OF THE
UNITED STATES,
HISTORICAL, GEOGRAPHICAL, AND
STATISTICAL;
EXHIBITING, IN A CONVENIENT FORM,
THE NATURAL AND ARTIFICIAL FEATURES
OF THE
SEVERAL STATES,
AND EMBRACING THOSE LEADING BRANCHES OF
GEOGRAPHY AND STATISTICS BEST ADAPTED TO DEVELOP THE
PRESENT CONDITION OF THE
NORTH AMERICAN UNION.
ILLUSTRATED WITH MAPS, &c.

BY WILLIAM DARBY.

VOL. I.

PHILADELPHIA :
PUBLISHED BY H. S. TANNER.

.....
1828.

Eastern District of Pennsylvania, ss.

BE IT REMEMBERED, that on the twentieth day of October in the fifty-third year of the Independence of the United States of America, A. D. 1823, Henry S. Tanner of the said district deposited in this office the title of a book, the right whereof he claims as proprietor, in the words following, to wit:

"View of the United States, Historical, Geographical, and Statistical; exhibiting, in a convenient form, the Natural and Artificial Features of the several States, and embracing those leading bases of History and Statistics best adapted to develop the present condition of the North American Union. Illustrated with Maps. By William Darby."

In conformity to the Act of Congress of the United States entitled, "An Act for the Encouragement of Learning, by securing the copies of Maps, Charts, and Books to the Authors and Proprietors of such copies, during the times therein mentioned;" and also to the Act, entitled, "An Act, supplementary to an Act, entitled, an Act for the Encouragement of Learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the times therein mentioned, and extending the benefits thereof to the arts of designing, engraving, and etching his and other prints."

D. CALDWELL,

Clerk of the Eastern District of Pennsylvania.

PREFACE.

IN the execution of the volume I now place before the public, the natural method was chosen in preference to the usual more regular course of geographical description. In the physical part names of artificial subdivisions have been introduced only where indispensable; and the names of a cities used as mere land-marks. The rivers traced in a connected series as far as possible, the continuity of the mountain systems traced as far as accurate data have been collected.

With such previous survey of the mountain river systems, and with their relative extent given, the artificial subdivisions can be referred clearly to their respective natural section. In a view, necessarily brief, only outlines could be given, and the principal benefit of such a view would have been lost by crowding the description with too much detail. The work is intended for practical use, therefore technical terms were excluded with scrupulous care.

Geology, as it stands in our books, being a science (if it deserves the name of a science) of conjecture, I have rejected, as far as practicable, that teach nothing definite. How far I have

ceeded the reader will decide; but my sedulous endeavours have been to render my little production a safe manual in regard to all ~~the~~ dependance that agriculture, commerce, and canal and road improvement may have upon correct geographical description.

In general but little of hypothesis has been hazarded, and this rule, in every case so necessary, has been observed respecting the climate. Long previous to writing for publication, on that or any other subject, I had been led, by lessons drawn from nature, to reject much that Volney and others had given as theory. With ample means placed at my disposal, I have collected and embodied data on the meteorology of the United States, as connected with that of the whole earth. In regard to personal means of observation, though my range was extensive, there is one, at least, to whom I must yield. That man's name is placed to the subjoined testimonial, which I gratefully make a part of this preface.

"Dear Sir: I have perused with great satisfaction your highly instructive Treatise on the subject of Climate generally, and that of the United States in particular; and it gives me pleasure to add my public testimony in favour of the correctness of your views and deductions. In regard to your conclusions respecting the temperature of the climate of the Great Valley or basin of the Mississippi, compared with that of the country bordering upon the Atlantic ocean, the best of my knowledge,

correct, and accordant with my own observations and experience in relation to this subject.

I remain, dear sir, very respectfully,

Your obedient servant,

S. H. LONG, *Topl. Engineer.*"

The substance of the meteorological observations referred to in Col. Long's Expeditions, and also the observations of Mr. Haines, are embodied in Chapter X. I always regard with peculiar respect the evidence of an actual observer, experienced on the subject which his testimony is requisite to support; and, therefore, consider the evidence of Col. Long, in the case of the climate of the United States, as going far towards a decision of the controversy.

On more than one occasion, I have stated that, on the principles of hydrostatics, the surface of the Gulf of Mexico must be very considerably elevated above that of the Atlantic ocean opposite the Chesapeake and Delaware bays. This theory is reiterated in the View of the United States, and I think stands on a secure basis, unless some other cause than gravitation can be given to account for a stream flowing upwards of one thousand miles, and towards its fountain, with steady and so great rapidity, as from three to five miles hourly.

The political divisions have been placed in alphabetical order, giving a facility of reference which would not have been compensated by any geographical engrouping. There cannot easily be made any division of the states and territories, in rega

to their relative position, against which very valid objections may not be urged.

In one respect the View has a manifest advantage. It not only gives from the best authority, that of the General Post Office, every county in the United States, at the beginning of the current year; but also embraces much of the original information collected by Mr. H. S. Tanner for his valuable Map of the United States. The counties are alphabetically arranged under their respective states, and with their relative position indicated.

With a candid reader it may not be necessary to state, that in a survey so widely extended errors must be expected. None will be found that my utmost care could prevent; but unaided as I have always been, in the collection of geographical material, the surprise to myself is that there are not more serious omissions at least.

In the boundaries and areas of the states and territories I have used round numbers, unless where my data demanded or authorised more precision.

Before closing this preface, I take the opportunity to tender my acknowledgments to Mr. McLean, Post-Master General; Mr. John Vaughan, Secretary to the American Philosophical Society; to Mr. Reuben Haines, of Germantown; and to Col. S. H. Long, of the Department of Topographical Engineers.

WILLIAM DARBY.

Baltimore, Oct. 18, 1828.



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View of the United States.



CHAPTER I.

HISTORICAL INTRODUCTION.

IN every occasion where I have been called upon to make the estimate, I have considered geography as a moral science. The interest we feel in tracing the features, developing the resources, and recording the improvements of any given portion of the earth, must arise from the character of the people who inhabit its surface. In this respect, not alone the territory of the United States, but all America, is acquiring daily more interest to arrest the attention of the statesman and philosopher.

The geography of the United States is a vast outline, tolerably traced, but the shades of colouring remain a void, except in a few instances. The intrinsic value of statistical knowledge can only be known from its application in augmenting the sum of general prosperity, by pointing out the springs of general resource. This invaluable pursuit has only recently assumed the character of a science, and, as such, is yet confined to a few countries, and is every where imperfect. Consequently, important as it may be as a moral and physical science, geography derives its highest value as an aid to human history. In this respect our views of nations are clear and decisive in proportion as we possess a comprehensive knowledge of their locality.

The accumulation of material for both history and geography, has been in America, during the last half century, too rapid and massive to admit adequate arrangement and record. Cities, towns, states,

and even empires, are presenting themselves, with a rapidity which outstrips the utmost effort of the pen or pencil. In the present instance, all that the author dared to undertake, was a general sketch of either the history or geography of his country; and in particular, a mere outline of the former, is all that the necessary brevity of "The View" would permit.

"Courage, wisdom, integrity, and honour, are not to be measured by the sphere assigned them to act in, but by the trials they undergo, and the vouchers they furnish: and if so manifested, need neither robes nor titles to set them off."*

The United States as a nation "*knows no fabulous age;*" in scanning its history, every point of outset is fixed and certain. The original colonies were, in most instances, established under the direct emigration of men, influenced by motives to action far above the ordinary moral incentives to human conduct.

From the subsequent consequences of such principles, no department of civil history demands from mankind such profound attention as the Anglo-American colonial. In these early establishments, the ancient Saxon free institutions were implanted, guarded, and flourished, whilst fading or expiring in Europe. It affords, to a well-regulated mind, a cheerful retrospect, the progress of new-formed societies, amongst the members of whom the most exalted principles of ethics, jurisprudence, and legislation, were not alone preserved, but received a more solid sanction in the hearts of men, from contrast with their retrogradation in their pristine seats.

When America was first discovered, the people of Europe and their rulers seem to have, with one accord, considered the newly-found regions the property of the first who could disembark on its shores.

* Benjamin Franklin's *Historical Review of the Constitution and Government of Pennsylvania*, p. 5.

In a struggle for division of so rich a prize, Spain, Portugal, England, and France, were the most conspicuous competitors. Expeditions were sent out under the authority of each of these governments. Henry VII., then king of England, sent to America, in May 1497, John Cabot, who, with his son Sebastian, discovered and coasted North America, from Newfoundland to the point of Florida. The Cabots were the first individuals recorded in history, who, under the authority of any European government, visited the south-east coasts of North America. There still, however, exists strong evidence, that, as simple fishermen, the Basques, or Bretons, from the north-west part of France, had visited the coasts of Greenland and adjacent parts, before any discoveries were made of the same places by national authority. During the long period which intervened, from the voyages of the Cabots to the actual colonization by both, the English and French nations seem to have preserved a nearly equal pace in the career of discovery.

An examination of the intervening history of England will afford solid reasons why the government and people of that kingdom did not sooner avail themselves of their claims in North America. Under the Tudors, neither the population nor resources of England were adequate to distant colonization, or, even commercial exertion; and to physical weakness were superadded political and religious contention.

The immense treasures in gold and silver procured from America, by the Spaniards, also tended to retard the northern nations of Europe from forming establishments on the opposing part of the newly discovered continent. Every nation considered America as a seat of mines, and when unable to procure the precious metals, disregarded every other advantage. *Although, however, slighted nationally, North America attracted the individual attention of many*

Englishmen, in the early part of the sixteenth century. In 1502, Hugh Elliot and Thomas Ashurst, merchants of Bristol, with some other associates, obtained letters patent from Henry VII., with the avowed intention of colonizing the newly discovered regions. The original of this patent in Latin, is preserved in Hazard's collections. It was the first English governmental grant respecting any part of America; but fell useless, no steps having been ever taken to carry its provisions into effect. The actual want of population at that time, in all Europe, but more particularly in the northern parts, opposed an insuperable barrier to colonization. In 1500, it is rendered probable, from concurrent circumstances, that the English crown did not include, under its subjection, three millions of people. Nautical skill and commercial enterprise were also still more contracted than were the number of inhabitants. The discoverers of North America, under English authority, were Italians; no English seaman of that age appears to have been competent to the execution of such an enterprise. A similar remark may be extended to Spain; as nearly all the discoverers under that crown were Italians. Hungry and cruel Spanish grandees, of the lowest class of their order, seized the fruits; but it was the scientific men of Italy, who cleared the path to the new garden of Hesperides.

The French were more attentive to North America, than were the English at this early period; and the former, much sooner than the latter, perceived the true source of wealth, offered by the then very imperfectly known wilds of the recently discovered continent. In 1504, the Breton and Norman fishermen had a regular trade and establishments on Newfoundland, which at that time included the whole coast from Labrador to Florida.* The Bretons and

* When the Cabots discovered North America, they gave to the

Normans, however, only visited the north-east parts, along the coast of the island of Newfoundland and vicinity.

John Denys, a native of Rouen, sailed, in 1506, from Honfleur to the gulf of Newfoundland, and on his return to France, drew a map of that inland sea, its islands, and adjacent shores.

Denys was followed, in 1508, by Thomas Aubert, from Dieppe. The latter was the discoverer of the St. Lawrence river, and the country now called Lower Canada. On his return to Europe, Aubert carried with him some of the native savages.

The Baron of St. Lery, in 1524, made some abortive attempts at colonization in North America. The failure of St. Lery's design, and many other adverse causes, gave a check to French enterprise, and prevented actual colonization on the part of that nation in New France, for upwards of eighty years afterwards. Though without settlements by land, nevertheless the French fisheries flourished, and the knowledge of the country by that people became annually more accurate.

The events of a voyage made by a Florentine,

parts they visited the name of Newfoundland, which it retained until superseded by that of Virginia, imposed by Queen Elizabeth, in 1584. At a subsequent period to the discoveries of the Cabots, the Spaniards discovered the south-west sections of the same coast, and named it Florida. Newfoundland and Florida, therefore, included all the coast of North America between the Cuba channel and St. Lawrence. The extremes on the Atlantic ocean, still retain their original appellations, whilst the intermediate space has been parcelled, and variously designated. See pages 28, 29.

It is a real subject of regret, that either Virginia or Florida had not prevailed, and been preserved over the whole Atlantic coast now in the United States. They are both fine sonorous names, and certainly preferable, as general terms, to the awkward expression United States. Either of the former would have been distinctive; the latter applies vaguely, to any combination of states into one general confederacy, and always demands circumlocution, to render its particular application definite.

- John Verrezzana, in the service of Francis I., king of France, are very imperfectly known. From the scanty records on the subject, it appears that, in 1524, Verrezzana reached the south-east coast of North America, and visited its shores from Florida to Nova Scotia. This discoverer was lost, and with him, in great part, the notes of his operations.

Though suspended in their efforts to either colonize or pursue their researches in America, the views of the French were constantly directed towards this continent. In 1534, Philip Chabot, admiral of France, represented so strongly to the king the multiplied advantages which Spain was then deriving from her colonies, that James Cartier, of St. Maloes, by royal commission, sailed from that port, April 20th, on a voyage of discovery, with two small ships and one hundred and twenty men. In his first voyage, Cartier sailed round the island of Newfoundland, discovered and named the Bay des Chaleurs, on the continent, and having afterwards reached N. Lat. 51°, on the Labrador coast, returned to Europe.

In his second voyage, 1535, Cartier penetrated the St. Lawrence as high as the island of Hochelaga, now Montreal, and having treacherously seized some of the natives, returned with them to France. Though disgraced by his conduct towards the savages of America, Cartier appears to have been the first individual from the north-west of Europe, who conceived an idea of the true wealth to be derived from the regions he had explored. He represented, in his report to the king, the great advantages which were offered by the fur trade alone ; however, not having gold and silver mines in his list, no notice was taken of his representations.

Nearly forty years had elapsed from the discoveries of the Cabots, before any serious attempt was made by the English nation to avail itself of the claim. In 1536, a gentleman of London, at his own risk, though countenanced by the king, Henry VIII.,

undertook a voyage to America. This adventurer, by the name of Hore, was accompanied by one hundred and twenty persons, of whom twenty-five or thirty were men of education and character. Hore's expedition was, in a peculiar manner, unfortunate. After having visited Cape Breton and some other places in the gulf of St. Lawrence, the party were reduced to the utmost extremity of want and wretchedness; many were literally starved. Falling in with a French fishing vessel, they seized her, and took from her as much provision as enabled the survivors to return to Europe. The facts attending this voyage, it has been observed, prove, that the English were then utterly ignorant of the inexhaustible stores of fish to be found in those seas; and that upwards of thirty years after a regular fishery had been established by the French, the English had not attempted a participation in that rich source of wealth and subsistence. From the sequel it will be seen, that strong reasons concur to support the conclusion, that the voyage of Hore contributed to turn the immediate attention of the English nation to the American seas. In 1548, the English fisheries had become an object of national legislation. In that year an act of parliament was passed, to prohibit the exaction, from English fishermen and mariners going in the service of the fishery at Newfoundland, of money, fish, or other reward, by any officer of the admiralty, under any pretext whatever. This was the first act of the English parliament relative to America.*

Cartier made his third voyage in 1541. Similar to that of England, the French government were inattentive to the value of the recently discovered territories in America; but many respectable individuals of both nations renewed, from time to time,

* *Hackluyt*, vol. i. p. 331—iii. p. 131, 132. *Chalmers*, vol. i. p. 9
Holmes' Annals, vol. i. p. 94.

projects of permanent colonization. The third voyage of Cartier was undertaken at the expense of Francis de la Roque, lord of Roberval, a gentleman of Picardy. Roberval was appointed by the king of France captain-general and viceroy of Canada and its dependencies, with full powers. Cartier, as deputy captain-general, was sent out by Roberval. The former, on August 23d, 1541, landed on Newfoundland, where he was, by appointment, to meet his principal. Roberval not arriving immediately, Cartier sailed alone to Canada, where he remained near two years, and built a temporary fort, near where Quebec now stands. In the mean time, Roberval not arriving in America, Cartier sailed on his return to Europe. Meeting Roberval on the coast of Newfoundland, Cartier disregarded his orders, and continued his voyage. Roberval proceeded to Canada, where he spent the winter of 1542-3, and returned to Europe in the spring of 1543. Francis I., the patron of Roberval, died in 1547, and with him terminated, for upwards of fifty years, any attempt at settlement in North America by the French. Unaided by his government, Roberval, accompanied by his brother, left France, with an intention to proceed to Canada, and was never again heard of.

So many disasters, and the distracted condition of France, under the expiring house of Valois, prevented any effective attention of the nation to Canada, until 1598. In that year, the Marquis de la Roche received from Henry IV. a commission to conquer Canada, and other countries not possessed by any Christian prince.

Twenty years before the date of the grant to De la Roche, Sir Humphrey Gilbert had received one of a similar import from Queen Elizabeth. In 1583, after repeated disappointments, Gilbert sailed to the island of Newfoundland, of which he took formal possession. On the 29th of August, his largest vessel, *with all its crew, was lost near Cape Race; and*

on his voyage towards England, this excellent but ill-fated adventurer was himself, with all his crew, lost on the 9th of September.

The grant of Gilbert was renewed in 1584, on May 25th, in favour of his maternal brother, Sir Walter Raleigh. The grant of 1584 expressly gave authority to Raleigh, to discover and conquer such heathenish and barbarous lands, as are not possessed by any Christian prince or people. Under the authority of Raleigh, Philip Amadas and Arthur Barlow sailed from England, in order to explore that part of North America called, by the Spaniards, Florida. Passing through the West Indies, Amadas and Barlow having reached the American coast, and examined its bays and rivers as far north as the mouth of Roanoke, returned to Europe in September 1584. The report of their discoveries was so seductive as to induce the queen to give the name of Virginia to the new acquisition to her dominions. Virginia continued for upwards of fifty years afterwards to designate in the English maps the whole coast from Florida to Labrador, and, except the island which still bears that name, superseded the term Newfoundland, imposed by the Cabots.

Richard Grenville as general, and Ralph Lane as governor, were deputed, with seven ships, to proceed to Virginia, by Sir Walter Raleigh, in 1585. The object of this expedition was to plant a colony. The fleet left Plymouth April 9th, and on the 25th of August reached the mouth of Roanoke, the point of destination. Governor Lane was left there with one hundred and ten persons, to commence settlement, and Grenville returned to England. This was the first attempt to form an actual establishment on the continent of America, made by the English nation, and failed; as in 1586, those of the colonists who had survived were found by Sir Francis Drake, in *so deplorable* a situation, as to induce that commander, *with the written request of Governor Lane,* to

convey them back to England. Some feeble exertions were subsequently made to restore the establishment, but were abortive. A few days after the departure of Sir Francis Drake, Grenville arrived with three vessels at Roanoke; but finding the place abandoned, left fifteen men to retain possession, and sailed to Europe. Early in 1587, Sir Walter Raleigh, anxious to preserve his colony, sent out three vessels and a company of one hundred and fifty people, incorporated under the title of "The county of Raleigh in Virginia," and with John White constituted as governor. The legislative authority was vested in the governor and twelve assistants.

In one of his voyages Sir Richard Grenville had discovered the mouth of Chesapeake bay, into which the colony of 1587 was directed to enter; but by some unexplained management of Fernando, their principal naval commander, these devoted people were landed on Roanoke island on the 22d of July. The new colonists found the bones of one man in one of the houses left by Lane's party; deer was found feeding, and melon vines clambering along the walls of the deserted buildings; but the fifteen men left by Grenville were gone for ever! a melancholy presage of the fate of the present colony.

On the 27th of August 1587, the governor sailed to England in quest of supplies; but of the wretched people left behind, no trace was ever since known. Thus closed the efforts of Sir Walter Raleigh, as to American colonization. No period in the sixteenth century could have been more inauspicious to colonization, than 1587. The nation was then at war with Spain; without disciplined troops; a navy scarcely deserving a name, when contrasted with the formidable fleet of its adversary; and the duke of Parma encamped at Dunkirk, with an army of fifty thousand veterans. In such a posture of affairs, *neither ships, seamen, and above all, experienced naval commanders, could be permitted to engage in*

any enterprise except national defence. Such men as Howard earl of Effingham, the two Drakes, Hawkins, Frobisher, and Sir Walter Raleigh, were too precious at home, to have them engaged in any distant expedition. The danger was imminent and pressing; and though absolute conquest, it is probable, could not have crowned the invaders, if their fleets and armies could have reached the English shores, yet such a shock must have produced lasting national deterioration. The Armada entered the English channel in May, where, battered by storms, and harassed by the light vessels and superior seamanship of the English, it was finally defeated, and almost annihilated. When danger is past, nations, like individuals, retain the impression, and continue measures of precaution, and stand ready to oppose a recurrence. This feeling of apprehension fully accounts for the neglect of a far distant colony, eighteen years after the defeat of the Armada.

In France, the house of Valois expired in 1589, by the death of Henry III., who was assassinated at Orleans, and Henry de Bourbon, as Henry IV., succeeded to the throne. A long series of civil and religious tumult was gradually followed by peace and prosperity, in France. As the arts of agriculture and commerce revived, individual enterprise was roused, and Canada again assumed its share of national attention. The American fisheries, about the termination of the 16th century, had commenced to engage the avidity of all western Europe, and after an interval of more than forty years, a French fleet, in 1591, sailed from St. Maloes to Canada. The same year George Drake, an Englishman, sailed up the St. Lawrence, and on his return published an account of his voyage. Drake's representations produced strong and immediate effects. Sylvester Wyatt, in 1594, found, amongst vessels of different other nations, above fifty English in St. Lawrence.

Under the grant from Henry IV., the Marquis

de la Roche sailed from France to Canada, with a colony of convicts. Success corresponded with the moral material of his crews; the plan proved abortive; De la Roche regained his native country to die of a broken heart. M. de Chauvin followed De la Roche in 1600, and was the first individual who imported Canadian furs into France. Chauvin made a second voyage in 1601; and whilst preparing for a third in 1603, died suddenly in France.

The impression on the public mind in England, by the fatal issue of all attempts made under Raleigh's patent, and by the oppressive war with Spain, were imperceptibly effaced, and in 1602, Bartholomew Gosnold had the spirit to attempt, and the honour to produce a revival of English adventure to America. In the summer of that year, Gosnold, in a small vessel with about thirty men, reached the shores of what is now Massachusetts. This active naval officer left England, by consent of Sir Walter Raleigh and his associates, and attempted a colony on Elizabeth islands. The stores and men were landed, but their obvious weakness created discontent and fear; the enterprise was relinquished, and the little colony re-embarked. This was the first attempt made by any European nation to obtain settlement in what is now designated New England.

American colonization, at this period, was supported by the able pen of Richard Hackluyt, who entered with zeal and sound judgment into the investigation of plans of discovery and settlement. By the active influence of this gentleman and others, and permission of Sir Walter Raleigh, the mayor and aldermen, and some wealthy merchants of Bristol, fitted out a small vessel of fifty tons, the *Speedwell*, and a bark of twenty-six tons, called the *Discoverer*, both commanded by Martin Pring. The object of this voyage was to discover and examine, more effectually than had been hitherto done, the

northern shores of Virginia.* Pring sailed from Milford Haven, April 10th, 1603, and reached the American coast amongst the islands of Penobscot bay. After ranging the shores to Massachusetts bay, Pring returned to Europe in August.

At the same period in which Pring was employed on the northern section of Virginia, Bartholomew Gilbert visited the more central parts, in search of the lost colony of Sir Walter Raleigh. Gilbert made the coast between Hudson and Delaware bays, about N. Lat. 40, and rashly going on shore with four of his principal men, were all destroyed by the savages. The fate of their leaders intimidated the surviving crew, who immediately set sail for Europe, without having, in any manner, fulfilled the objects of their voyage.

November 3d, 1603, an event occurred, which places in a strong light the vagueness of English and French claims in North America. Henry IV. granted to Pierre du Gast sieur du Monts, a patent for that American territory extending from N. Lat. 40° to 46°, with a commission of lieutenant general of that portion of country; and with power to conquer, colonize, and rule it, and to christianize the natives. The king of France, soon after, granted to this officer and his associates a monopoly of the fur and peltry trade, in the province of Acadia and Gulf of St. Lawrence. In the same year of Du Monts' patent, Samuel Champlaine, a native of Brouage in France, sailed up the St. Lawrence river, and made many extensive and important discoveries.

The fisheries around Newfoundland had already become highly valuable; more than two hundred sail of vessels and above ten thousand men were engaged in that business.

* Now New England. It has been shown, that in the early periods of English colonization in North America, the name of *Virginia* was extended indefinitely. See p. 17.

The Sieur du Monts, with Champlaine as his pilot, and attended by M. Poutrincourt and a number of other volunteer adventurers of respectability, embarked in two vessels for America. He made first the coast of Nova Scotia, then Acadia, and anchored in Port Rosignol, now Liverpool. Coasting round Cape Sable, the immense bay of Fundy was explored. Poutrincourt fixed his residence at N. Lat. $44^{\circ} 30'$, where, on a fine bay, he established a village, to which he gave the name of Port Royal. This place is now the town of Annapolis, and was the first French settlement in North America.

By the joint exertions of Du Monts and Champlaine, the rivers, bays, and inlets of both sides of the bay of Fundy, and part of Maine, were discovered during this voyage. Du Monts wintered 1604-5, at the mouth of the Schoodick, now St. Croix, on a small island, at present the north-east limit of the United States, on the Atlantic coast.

In 1605, the seat of the French colonial government, if it then deserved the title, was fixed at Port Royal. This was two years before the establishment of the English colony at Jamestown, and four before the French settlement at Quebec. The two nations were each, however, emulous of discovery and colonization. The Earl of Southampton and Lord Arundel, in 1605, fitted out a small vessel to attempt a south-west passage, and gave the command to George Weymouth, who appears, from his operations, to have had, even for that period, a very inaccurate knowledge of the North American coast. He made land in about N. Lat. $41^{\circ} 30'$, and coasting thence north, discovered the mouth of a large river, supposed to be the Penobscot, up which he sailed for some distance, and in July set sail on his return to England.

One hundred and nine years had now elapsed since the discoveries first made on the south-east coast of North America, by the Cabots. Though

England and France, in the interim, occasionally prosecuted voyages of discovery, and though both nations, in the beginning of the 17th century, pursued their fisheries with activity, neither, if we except the trifling French port at Port Royal, had a single fortress or factory on shore. It may be noticed that, as early as 1577, the fisheries employed 150 French vessels, 100 from Spain, 50 from England, and 50 from Portugal. According to Joseph Childs, the Newfoundland fisheries, as those on the North American coast were designated, then employed 10,000 seamen. The English nation, destined ultimately to become the ruling power in that part of the North American seas, islands, and continent, now the United States and Canada, were, during the 17th and the early part of the 18th century, much less active than its rivals, particularly France. At, and for a century before, the epoch of actual colonization, English enterprise was in a great part exhausted in abortive attempts to find a north-west passage to China and India. The rage for discovering mines of the precious metals, was then also at its height. Rational projects of colonization, founded on a commercial and agricultural basis, had not been then conceived by any nation of Europe, much less by England.

Local, domestic, and political causes were, however, most efficacious in preventing England and France from emulating Spanish and Portuguese enterprise in America. In England, the long, vigorous, successful, and politic administration of Elizabeth, was, with all its beneficial effects, inadequate to heal all the wounds inflicted by a century of anarchy, civil war, or misgovernment which preceded her reign. The resources of France and the chivalrous gallantry of its people, were employed, during almost the whole of the century, in either wars of ambition, national defence, or civil tumult. Henry IV., as late as 1600, had merely succeeded in se-

curing his crown by force of arms, and had yet obtained little leisure to cultivate the arts of peace.

In both nations, finances, able seamen, and commercial knowledge were wanting; and to these moral were superadded physical impediments to foreign colonization, arising from deficiency of population. Though thus retarded, nevertheless, the germ of national force subsisted, and the spirit to give that force effect, was annually gaining intelligence by means of the press, and preparing for that long and embittered rivalry in America, which gave ascendancy to English over French power on this continent.

At the epoch of actual colonization in North America by the English, the entire coast of this continent, from Labrador to Cape Florida, was known by two general names, Newfoundland and Florida. When the Cabots made their discoveries, during the last years of the 15th century, they imposed the name of Newfoundland on the coast which they visited. This term was perpetuated in English books and maps during great part of the 16th century, and was gradually, by the imposition of other names for sectional subdivisions, restricted to the island still known as Newfoundland. (See page 17.)

On the second of April, 1512, Juan Ponce de Leon, a Spaniard, discovered the coast of North America from the West Indies, and imposed upon his newly discovered region the name of Florida. This term originated from the circumstance of De Leon having descried land on Palm Sunday; "Pasqua Florida," in the Spanish language. Florida became general to designate the south-east coast of North America, not only in Spanish, but in the geographical works of the south of Europe. No definite limit separated the Newfoundland of English from the Florida of Spanish and Italian geography. The latter like the former slowly yielded to other sectional terms, and now is confined, and perpetuated

to designate, the south-east subdivision of the United States.

Raleigh's patent of March 25th, 1584, being vacated by his subsequent attainder, a number of gentlemen, instigated principally by Mr. Hackluyt, obtained, by petition addressed to James I., a patent, dated April 10th, 1606, for that part of North America extending from north lat. 34° to 45° . As the name Virginia, given by Queen Elizabeth, had already in a great measure superseded that of Newfoundland, the former was adopted in the patent of James I. The immense zone of 14 degrees of latitude was subdivided into two, North Virginia and South Virginia, and granted to two distinct companies.

The southern, named the first colony, was granted to what was then called the London Company, and the northern to the Plymouth Company.

Such were the preliminary steps which led to a system of colonization, the most important in history, which has long since produced the United States, and prepared the foundation of another nation in Canada. The brevity of this view precludes the insertion of more than a simple chronological series of events, from the original settlement in Virginia, under the patent of 1606, up to the organization of the territory of Florida, 1821, and fixing the existing ratio of representation, 1822, of course establishing the actual political condition of the United States.

- 1607 April. First effective settlement of the English in America, at Jamestown, Virginia.
- 1610 Dutch form settlements on the Hudson.
- 1611 An abandonment of the colony of Virginia prevented by the timely arrival of Lord De la Ware.
- 1612 Second charter of Virginia.
- 1613 Marriage of Pocahontas to Mr. Rolfe—a most propitious era in the history of Virginia; this

- guardian angel of the colony had saved the life of Captain Smith, and scattered peace and security around his dwelling.
- 1619 First general assembly called in Virginia.
- 1620 Plymouth settled; the first colony established in Massachusetts, and the second English colony in America; African slaves first introduced into Virginia.
- 1621 New Netherlands, now New-York, granted by the States General to the West India Company of Holland; New Hampshire granted to Gorges and Mason.
- 1623 Settlements began at Piscataqua; and Fort Orange, now Albany, founded.
- 1625 Government of Virginia vested in the crown of England.
- 1627 Delaware planted by the Swedes and Fins.
- 1628 Massachusetts granted to Henry Boswell. Plymouth company erect trading houses on Connecticut river. John Endicott arrives in Massachusetts with a new body of settlers.
- 1629 Boston founded. Wheelwright's grant from the Indians. Grant to Mason by the Plymouth Company of part of what is now called Maine.
- 1632 Charter of Maryland granted by Charles I., with equal privileges to all Christians.
- 1633 Severe penal laws passed in Virginia against dissenters. First settlement of Connecticut at Hartford.
- 1634 Charter of Plymouth annulled by the crown. Contests respecting limits between Connecticut and New Netherlands. First effective colony of Maryland planted at St. Mary's.
- 1635 John Winthrop governor of Connecticut. Gorges sold New Hampshire to Mason.
- 1636 Colony of Providence founded by Roger Williams.
- 1637 War in Connecticut with, and ruin of, the Pequods.

- 1638 Harvard College, now Cambridge University, founded. Colony of New Haven founded. Rhode Island settled by Coddington. Contest between Connecticut and New Netherlands.
- 1639 Written constitutions formed by Connecticut and New Haven. Privileges of Virginia restored to the colony. Maine granted to Sir Francis Gorges. First English printing press in America founded at Cambridge, Massachusetts.
- 1642 Kieft, governor of New Netherlands, expelled the English from the Delaware.
- 1643 Charter of Rhode Island granted to Roger Williams. Massachusetts, Connecticut, and New Haven unite for mutual defence against the Indians.
- 1650 Boundaries between Massachusetts and Connecticut fixed. First constitution of Maryland formed. Carolina founded by emigrants from Virginia.
- 1651 Parliament of England infringe the privileges of Maryland. Dutch built a fort at Newcastle, Delaware, and erect trading houses on Delaware river.
- 1652 Maine submits to Massachusetts. First American mint established in Massachusetts. Virginia submits to Cromwell.
- 1653 New Hampshire claimed by the heirs of Mason. Violent disputes between Connecticut and New Netherlands.
- 1654 English navigation act rigidly enforced in Virginia.
- 1655 Swedes on the Delaware submit to the government of New Netherlands, under governor Stuyvesant.
- 1656 Fendal's insurrection in Maryland.
- 1659 Royal government restored in Virginia.
- 1660 New Hampshire adjudged to Mason's heirs by Charles II.

- 1661 Settlements made by emigrants from New England, near Cape Fear river in North Carolina. Laws of England adopted in Virginia.
- 1662 Church of England established by law, by an Act of Assembly, in Virginia. Charter of Connecticut granted. Authority of Calvert restored in Maryland.
- 1663 Lord Clarendon received a patent of that part of North America between N. lat. 31° and 36°.
- 1664 New Netherlands conquered by the English, and granted, with great part of what is now New Jersey, Delaware, and Pennsylvania, to the Duke of York, by his brother Charles II. New Jersey conveyed by the Duke of York to Beverley and Carteret.
- 1665 Massachusetts had 4000 enrolled militia. Cities of Albany and New-York incorporated. Connecticut and New Haven united. Government of Rhode Island outlaws the Quakers.
- 1667 Constitution of Carolina formed. New Jersey becomes a distinct province.
- 1669 First assembly of Carolina.
- 1670 First settlement in what is now South Carolina, under Mr. Locke's constitution.
- 1673 First parliament of Carolina meets. Dutch reconquer New York, which is restored to England by treaty the ensuing year.
- 1675 Destructive war with the Indians under Philip, against whom are united Massachusetts, Plymouth, New Hampshire and Connecticut. Insurrection in Virginia against the royal authority: the colony contained a population of 50,000.
- 1676 War with the Indians in New-England ended by the defeat and death of Philip. Rebellion in Virginia under Bacon.

- 1677 West Jersey claimed by the Duke of York. Quakers settle at Burlington. Maine purchased from Gorges by Massachusetts.
- 1678 Commercial imports into New-York amount to 50,000 pounds colonial currency.
- 1679 New Hampshire separated from Massachusetts, and made a separate colony.
- 1680 Charleston in South Carolina founded, and made the seat of government. Naturalization act in Virginia. Government of West Jersey usurped by Andros, governor of New York, and restored same year. First assembly of New Hampshire met at Portsmouth.
- 1681 Patent for Pennsylvania granted to William Penn, and first colony under, arrives.
- 1682 Delaware and New Jersey, with Pennsylvania, under the government of William Penn. First frame of Pennsylvania government formed.
- 1683 Charter of Massachusetts vacated by *quo warranto*. New frame of government formed in Pennsylvania. Printing presses forbidden by the royal governor in Virginia.
- 1685 *Quo warranto* issued against the charter of Rhode Island, and a similar writ against Connecticut.
- 1686 *Quo warranto* issued against New Jersey. Andros appointed royal governor of New England.
- 1689 Revolution in England, expulsion of the Stewarts, a most desirable event in the Anglo-American colonies.
- 1690 First paper money issued by Massachusetts. Schenectady in New York destroyed by the French and Indians. Government of Maryland resumed by the crown. New Hampshire united to Massachusetts.
- 1691 New charter of Massachusetts, including Maine, granted by William and Mary. Assembly of New York again convened.

- 1692 Witchcraft madness in Massachusetts. Connecticut and Rhode Island resume their charters by permission of William III. University of Virginia incorporated by charter.— Treaty between New York and the Five Nations of Indians. Pennsylvania made subject to New York, by the king of England, who seizes the government of Delaware. New Hampshire irrevocably separated from Massachusetts. Protestant religion established in Maryland by law.
- 1693 Locke's frame of government in Carolina abrogated, and one formed agreeable to charter. William and Mary College in Virginia founded.
- 1694 William Penn restored to his rights over Pennsylvania and Delaware.
- 1695 Rice planting introduced into Carolina.
- 1696 Third frame of government in Pennsylvania adopted. City of New York contains 6,000 persons.
- 1698 Assembly of Connecticut separated into two houses.
- 1699 Annapolis becomes the seat of government of Maryland, and has remained so until the present time. Duty on slaves imported into Virginia imposed.
- * 1700 Act of Assembly of New York makes it punishable with death for any popish priest who should enter that colony. Grant of lands to William Penn made by the Susquehannah Indians. Episcopacy introduced into Pennsylvania.
- 1701 Yale College at New Haven founded.— Rhode Island contains 10,000; New York 30,000; New Jersey 15,000; Maryland 25,000; Virginia 60,000. Government of New Jersey surrendered to Queen Anne; East and West *Jersey united*. New charter or frame of go-

- vernment for Pennsylvania granted by William Penn. Philadelphia incorporated, and Delaware separated from Pennsylvania.
- 1703 Duty of 4*l*. imposed on every negro imported into Massachusetts.
- 1704 First Anglo-American newspaper, the Boston News Letter, published at Boston. Tonnage duty on foreign vessels imposed in Rhode Island.
- 1706 Assembly of Pennsylvania refuses to pass militia laws. French and Spaniards besiege Charleston, but are repulsed with great loss.
- 1709 Paper money emitted in New York. Bills of credit emitted in New Jersey.
- 1710 Palatines from Germany settle on the Roanoke, and other German emigrants in New-York. New England colonies harassed by the French and Indians. Palatines from Kresheim found Germantown near Philadelphia.
- 1712 Virginia divided into parishes, and the clergy given a regular salary by law. Dreadful massacre in Carolina by the savages. Albany contains 1000 inhabitants.
- 1713 Boundaries between Connecticut and Massachusetts arranged.
- 1714 Spotswood first crosses the Apalachian mountains, from Virginia to the valley of Ohio.
- 1715 Yamassee Indians attack Charleston, and are repulsed.
- 1716 Government of Maryland restored to Lord Baltimore after having been usurped by the crown twenty-six years.
- 1717 The shipping of Massachusetts employs 3,493 sailors. Paper money issued in New Hampshire.
- 1719 Proprietary government in Carolina abrogated, and the base laid for an entire separation of the colony into North and South Carolina. First presbyterian church founded in

- the city of New York. First newspaper in Pennsylvania, the Weekly Mercury.
- 1720 First royal governor of North Carolina. Trade from New York to Canada forbidden by act of Assembly of the former colony. New England, particularly Maine, severely harassed by the Indians.
- 1721 Inoculation for the small pox introduced into Massachusetts. Treaty with the Indians made by North Carolina.
- 1722 Oswego in New York founded. A population of 94,000 in Massachusetts.
- 1723 First paper currency in form of bills of credit issued, and made a legal tender in Pennsylvania. Beaufort in South Carolina incorporated.
- 1724 Bills to the amount of 30,000*l.* emitted in Pennsylvania.
- 1726 After a most distressing war with the savages, Maine makes peace. New Hampshire had already formed a treaty the previous year. Massachusetts receives from England an explanatory charter regulating the governor's authority.
- 1727 New Hampshire adopts a constitution of government. Fort erected at Oswego.
- 1729 Quakers and baptists relieved from paying the regular clergy in Connecticut.— Trade between New York and Canada restored. Emigrants to the number of 6000 come from Europe to Pennsylvania. Carolina permanently divided into North Carolina and South Carolina.
- 1730 Massachusetts supposed to contain 120,000 inhabitants ; 20,000 militia and 5,000 sailors. Treaty between South Carolina and the Cherokees. Rhode Island contained a population of about 18,000, of which 1,650 were *negroes*.

- 1731 Boundary between New York and Connecticut fixed by commissioners. Philadelphia contains 12,000 inhabitants, and the colony supposed to employ 6,000 tons of shipping.
- 1732 Georgia founded by General Oglethorpe, under patent from George II. Boundary between Delaware and Maryland fixed, as also that between Maryland and Pennsylvania. Tobacco made a legal tender in Maryland.
- 1733 First colony of Georgia established; treaty between Georgia and the Creeks, and Savannah founded. First newspapers published in New York and Rhode Island.
- 1735 Wilmington in Delaware founded. Oppressive royal government over New York. Destructive insurrection of the negroes of South Carolina.
- 1736 Colony of Highlanders arrive in Georgia. Trade of Maryland employs 130 sail of vessels; Virginia and Maryland exporting 210,000 lbs. of tobacco. In Pennsylvania 211 vessels entered and 215 cleared.
- 1738 The first Governor of New Jersey independent of New York, Lewis Morris.
- 1739 Virginia suffered severely from her co-operation with England in an unsuccessful expedition to Carthagen. Boundaries between Massachusetts and New Hampshire fixed, and in the ensuing year, 1740, confirmed, by a decree of the privy council in England.
- 1740 Unsuccessful expedition from South Carolina against St. Augustine.
- 1741 Benning Wentworth, first Governor of New Hampshire separate from Massachusetts. Dangerous conspiracy of the negroes in New York defeated. Moravians found Bethlehem on the Lehigh, Pennsylvania.
- 1742 *Treaty of Philadelphia with the Six Nations, who release a large tract of land on both*

- sides of the Susquehannah. Spaniards from Florida invade Georgia, but are repulsed. New form of government in Georgia. Massachusetts supposed to have a population of 160,000.
- 1744 Maine contained 2485 men on the militia rolls.
- 1745 Claim of Mason's heirs, in New Hampshire, adjusted. Massachusetts supplies for an expedition against Louisburg, 3250; Connecticut, 500; Rhode Island, 300; Pennsylvania, 4,000*l.* for provisions.
- 1746 Massachusetts embodies a force of 3500 to act with the British in an expedition against Canada; Connecticut raised for the same purpose 1000; New Jersey 500; Pennsylvania 400; Maryland 300.
- 1747 Indigo to the amount of 200,000 lbs. exported from South Carolina. Village of Saratoga destroyed by the savages.
- 1748 Newark college removed to Princeton, New Jersey.
- 1749 The Indians of Maine submit to the authority of the colony. Grants first made by New Hampshire to settlers in Vermont. Vessels in Pennsylvania entered 303, cleared 291.
- 1750 Emigrants to the number of 4300 from Germany, and 1000 from Great Britain, arrive in Pennsylvania. Connecticut estimated to contain a population of 100,000.
- 1753 Exports from Pennsylvania, for three years, 647,317*l.* Philadelphia contains a population of 18,000.
- 1754 Hostilities renewed with the Indians by Maine, Massachusetts and New Hampshire. The joint exports of Virginia and Maryland amount to 632,574*l.* and the imports to 356,776*l.* Major, afterwards General Washington, given the command of a Virginia regiment, which *he marched towards the Ohio; was at first*

- successful, but opposed by a superior force, was compelled to capitulate. Cotton first exported from South Carolina.
- 1755 General judicial court established in Georgia. Indians cede an extensive territory to North Carolina. Convention of colonial governors meet. Maryland by actual enumeration contains a population of 108,000. Fort Edward on Hudson river, New York, built. Rhode Island contains a population of 35,939, and New Hampshire 34,000. General Braddock defeated and slain by the French and Indians near Pittsburg.
- 1756 Fortifications erected along the frontier of Georgia. Fort on Tennessee river built. Fort Oswego, New York, taken and destroyed by the French.
- 1757 City of New York contained a population of 12,000.
- 1758 Exported from Virginia 70,000 hogsheads of tobacco. Treaty of Easton, Pennsylvania, with the Indians. British army under General Abercrombie defeated with great loss by the French at Ticonderoga. A force of 5000 men raised in Connecticut to invade Canada ; 7000 raised for a similar purpose in Massachusetts.
- 1759 Ticonderoga, Niagara, and Pittsburg taken by the British.
- 1760 Bills of credit emitted in Georgia. War on the frontiers of North Carolina with the Indians. Counties of Lincoln and Cumberland, Maine, formed.
- 1761 War continues between the two Carolinas and the Cherokees. The Penobscot Indians in Maine submit.
- 1762 Nov. Secret treaty between France and Spain, by which Louisiana was ceded by the former to the latter power.

- 1763 The peninsula between the Alatomaha and St. Mary's made part of Georgia. Population of North Carolina 95,000; of Virginia 170,000; of New Jersey 100,000; of Connecticut 141,000. New York exports to the value of 54,000*l.*, and imports 238,500*l.* Maryland contains a population of 70,000. Joint commerce of Virginia and Maryland amounted in exports to 642,300*l.* in imports 555,400*l.* Peace of Paris, by which Canada was ceded to Great Britain.
- 1764 Massacre of the Indians at Lancaster, Pennsylvania. Large number of Germans remove to and settle in South Carolina. Brown University in Rhode Island founded. Medical school in Philadelphia founded by Dr. Shippen.
- 1765 Stamp Act passed by the British Parliament; produced on its promulgation the most violent tumults at Boston, and was opposed by most of the colonies, but the first legislative proceeding declatory of American rights was made in the Virginia house of burgesses. Massachusetts proposed a Continental Congress; South Carolina first met the proposition, and was followed by all the colonies, except New Hampshire, which dissented; and Virginia, North Carolina and Georgia, which were prevented from sending delegates by their respective governors. The Congress met at New York, and James Otis, of Massachusetts, took the lead on the side of law, humanity and freedom.
- 1766 Stamp Act repealed. The population of South Carolina 135,000; New Jersey 161,000; and New York 168,000.
- 1769 Louisiana taken possession of by Spain, in *virtue* of the treaty of 1762.
- 1770 Affray at Boston, between the people and the royal troops.

- 1771 Regulators, a lawless assemblage in North Carolina, are suppressed by Governor Tryon.
- 1773 Tea destroyed at Boston. Tea ships sent back to London from Pennsylvania. Assembly of Virginia appoints a committee of correspondence with the other colonies.
- 1774 Boston port closed by British authority; and the provincial assembly of that colony meets at Concord. British military stores seized at Portsmouth. Assembly of Connecticut erects the Wyoming valley into a town, under the charter of that province. Royal artillery and military stores seized in Rhode Island. Continental Congress met September 5th, in Philadelphia, and chose Peyton Randolph, of Virginia, their President; all the colonies, 13 in number, except Georgia, were represented, 12 having sent delegates.
- 1775 Battle of Lexington, and Bunker's hill near Boston. Washington made commander in chief, besieges Boston. Ticonderoga taken by the Americans. Georgia accedes to the confederation. Constitution of Delaware formed.
- 1776 Jan. 1st, General Montgomery defeated and slain at Quebec. March 17th, Boston evacuated. May 5th, the American army quits its lines near Quebec, and rapidly evacuates Canada. July 2nd, Constitution of New Jersey adopted. July 4th, Independence declared at Philadelphia by Congress. July 5th, Constitution of Virginia adopted. 8th, British fleet repulsed before Sullivan's island near Charleston. August 14th, Constitution of Maryland adopted. 22nd, British army lands on Long Island, and battle of Flatbush on the 27th, Americans defeated. September 14th, New York evacuated by the American army. The Colonies first designated UNITED STATES, by res

lution of Congress. Commissioners sent to France. October 28th, Battle of White Plains near New York. November 16th, British take Fort Washington. 18th, Americans evacuate Fort Lee. 28th, General Washington retreats over the Delaware. December 12th, Congress retires from Philadelphia to Baltimore. 13th, General Lee taken prisoner in New Jersey. 26th, Surprise and capture of 900 Hessians at Trenton.

- 1777 Jan. 3d, Battle of Princeton, British defeated. April 20th, Constitution of New York adopted. 26th, British destroy the stores at Danbury. May 23d, Colonel Meigs destroys the British stores at Saggy Harbour, Long Island. July 6th, General Burgoyne takes Ticonderoga. August 6th, General Herkimer defeated by the Indians. 16th, battle of Bennington, German troops under British colours and pay utterly defeated. September 11, battle of Brandywine, Americans defeated. 19th, battle of Stillwater near Saratoga, New York. 20th, General Wayne surprised at Paoli, Chester county, Pennsylvania, and his troops massacred by the British. 27th, Philadelphia taken by the British. October 4th, indecisive battle of Germantown. 6th, Forts Clinton and Montgomery taken by the British. 7th, British defeated at Stillwater; and General Burgoyne surrendered his army on the 17th, at Saratoga. 22nd, British repulsed at Red Bank. December 18th, Constitution of North Carolina adopted.

- 1778 Feb. 6, Treaty of alliance between the United States and France. The American frigate Randolph, of 32 guns, engages the British ship Yarmouth, of 64; former blown up. June, Commissioners arrive from Great Bri-

tain to treat with Congress ; propositions of the former rejected by the latter. 18, Philadelphia evacuated by the British, who retreat towards New-York, are pursued, and on the 28th defeated by the Americans under General Washington, at Monmouth in New Jersey. French fleet arrives at Newport. July 1, Massacre at Wyoming. Aug. 29, Indecisive battle on Rhode Island. Dec. 29, British defeat the American General Howe, and take Savannah.

- 779 General Lincoln takes command of the southern army in January. March 3, Battle of Briar-creek, near Savannah ; Americans defeated. The British advance towards Charleston in April ; invest that city, but are compelled to raise the siege May 12. Indecisive battle of Stono ferry, June 20th ; the British had in the interim invaded Virginia, and taken Portsmouth and Norfolk. July 5, New-haven plundered, and on the 7th, Fairfield, Norwalk, and Green-farms, in Connecticut, burnt by the British. 16, Stony-point stormed by the Americans under General Wayne. 19, British post at Paulus-Hook, opposite New York, surprised and taken by Major Lee. Aug. Expedition of General Sullivan against the Indians of the Six Nations. September 23, Naval battle off Flamborough Head, two British frigates captured by Paul Jones. October 4, Americans and French besiege Savannah, and on the 9th meet a sanguinary repulse in an attempt to storm the place.

- 780 In January, a powerful British expedition, under Sir Henry Clinton, sailed for South Carolina. Constitution of Massachusetts adopted March 2d. March 21, Charleston besieged by the British, who surprise the Ame-

icans at Monk's Corner, and by bombardment, May 12th, force Charleston to surrender. May 29, Colonel Buford defeated at the Waxhaws by Colonel Tarleton. June, Lord Cornwallis left in command of the British in South Carolina; Sir Henry Clinton returned to New-York. 23, Indecisive action at Springfield in New Jersey. July 12, Party of British defeated by General Sumpter. Aug. 6, Prince of Wales's regiment surprised and utterly defeated by General Sumpter at the Hanging Rock. 16, Americans meet a severe defeat at Camden, South Carolina.—September 21, Arnold escapes from West Point, and Major Andre taken by the Americans. October 7, Battle of King's Mountain, British and Tories defeated, and their commander, Colonel Ferguson, killed. Nov. 20, Colonel Tarleton defeated by General Sumpter.

- 1781 Jan. 1, Revolt of the Pennsylvania troops, which is soon suppressed. 17, Decisive defeat of the British under Colonel Tarleton, by General Morgan, at the Cowpens. March 15, Battle of Guilford Court-house. April 25, Second battle at Camden, Americans defeated. September, Indecisive action off Virginia, between the English and French fleets. Arnold, now a British officer, takes and burns New-London, and massacres the garrison of Fort Griswold, September 6. Battle of Eutaw Springs on the 8th, British defeated. 14, The American army under General Washington, reaches Williamsburgh, and opens the campaign against Cornwallis; invests Yorktown on the 30th, and, in conjunction with the French fleet, compels the British general to surrender himself and army on the 19th of October.

- 1782 Bank of North America, which had been organized in December 1781, received a charter from Pennsylvania, April 1. Indians defeated near Savannah by General Wayne. Treaty between the United States and Holland, October 8. Nov. 5, At Portsmouth, in New Hampshire, was launched the AMERICA, 74 guns, the first United States ship of the line. Nov. 30, Provisional articles of Peace.
- 1783 Feb. 5. Sweden acknowledges the Independence of the United States. 15, Treaty between the United States and Denmark. March 22, Congress commutes the officers' half-pay for life for full-pay for five years. March 24, Independence of the United States acknowledged by Spain, and by Russia in July. September 23, Definitive Treaty of Peace between Great Britain, France, and the United States, signed at Paris. October 18, American army disbanded by proclamation of Congress. Nov. General Washington published his admirable Farewell Address. 25, New-York evacuated by the British.— Dec. 4, General Washington takes leave of his officers ; on the 23d resigned his commission into the hands of Congress, and retired to private life. Society of Cincinnati formed.
- 1784 Feb. First voyage from the United States to China undertaken in the ship Empress of China. St. John's college, in Annapolis, and a Roman Catholic college, Georgetown, Maryland, founded. Bank of Massachusetts incorporated.
- 1785 Treaty between the United States and Prussia. Athens University, in Georgia, founded.
- 1786 From August 22, until March 10th, 1787, *civil tumult*, almost amounting to actual war, *agitated* Massachusetts and New Hamp-

shire ; but by wisdom, moderation and firmness, was in the end happily appeased. Portland, in Maine, incorporated, and Harrisburg in Pennsylvania founded. Columbia, the present seat of government of South Carolina, founded.

- 1787 Convention in order to frame a federal Constitution met at Philadelphia, May 25th, and agree upon one September 17, which was reported to Congress, and on October 4, by a resolution of that body, referred to each state in convention. The new Constitution was ratified, by Delaware, Dec. 7; by Pennsylvania, Dec. 12; by New-Jersey, Dec. 18; by Georgia, Jan. 2, 1788; Connecticut, Jan. 9; Massachusetts, Feb. 6; Maryland, April 28; South Carolina, May 23; New Hampshire, June 21; Virginia, June 26; New York, July 26; North Carolina, Nov. 21, 1789, and by Rhode Island, May 29th, 1790.
- 1787 continued. In that year New York ceded a large tract of land to Massachusetts; and South Carolina ceded her western territory to the United States. Columbia College in New York incorporated.
- 1788 Black cotton seed introduced into Georgia from the Bahama Islands.
- 1789 March 3. The new Constitution went into operation: George Washington was elected President, and John Adams Vice-President, who were inaugurated at New-York, April 30th. Seat of government of South Carolina removed to Columbia. First Roman Catholic bishop in the United States consecrated, and first Roman Catholic church in Boston founded.
- 1790 April. Congress accepts from North Carolina a cession of that territory now state of Tennessee; and a territory south of Ohio

- formed, May 20. September 2, Existing Constitution of Pennsylvania adopted. 20, General Harmar defeated by the Indians. Dec. Vermont and Kentucky permitted by Congress to form Constitutions. Existing Constitution of South Carolina adopted. First Census of the United States taken, and reported a population of 3,929,526, of whom 695,655 were slaves.
- 1791 Feb. 18, Vermont admitted into the Union as an independent state. March 3, Subscribers to the Bank of the United States incorporated by act of Congress; same day, Nov. 4, General St. Clair defeated by the Indians. Burlington College, Vermont, founded. Revenue of the United States \$4,771,000, expenditure \$3,797,000, and exports upwards of \$19,000,000. Exports of New York alone, \$2,505,000.
- 1792 June 1, Kentucky admitted into the Union as a state. Existing constitutions of Delaware and New Hampshire adopted. Banks of New Hampshire, Pennsylvania, and South Carolina established. Union Bank in Boston incorporated.
- 1793 March 4, George Washington a second time enters on his duty as President, and John Adams as Vice-President. April 29, Proclamation of neutrality issued by the President of the United States. In the autumn of this year the yellow fever ravages Philadelphia.
- 1794 Congress passes an act to fortify and to prepare a naval armament in the ports of the United States. July, Insurrection in western Pennsylvania, which is in the sequel suppressed without bloodshed. Aug. 20, General Wayne defeated the Indians on Maumee. Nov. 19, Treaty, usually called Jay's treaty

between the United States and Great Britain, concluded.

- 1795 Aug. Treaty of Greenville, between the United States and western Indians, concluded. Oct. Treaty between the United States and Spain. Nov. Treaty between the United States and Algiers. Georgia passes an act to sell its western lands.
- 1796 Tennessee admitted, June 1, into the Union as a state. Western posts, Detroit, &c. delivered to the United States in virtue of Jay's treaty.
- 1797 Treaty of peace between the United States and Tripoli concluded in January. July 7, In consequence of increasing difficulties with France, Congress passes an act, declaring the existing treaties with that nation no longer obligatory on the United States. Oct. Constitution frigate launched at Boston.
- 1798 May, Congress augments the army and navy, and in June authorises merchant vessels to arm in their own defence. July 13, George Washington appointed commander in chief, with the rank of lieutenant general. Oct. 2. Massachusetts cedes to the United States Castle William, in Boston harbour. Oct. 25. The United States and British boundary in St. Croix river determined by commissioners. Transylvania university in Kentucky founded.
- 1799 Feb. Commodore Truxton, in the frigate Constellation, of 38 guns, captures the French frigate L'Insurgente, of 44 guns. May 26, Treaty between the United States and Tunis concluded. July 11, Treaty between the United States and Prussia. New embassy to France. American navy carrying 950 guns on 42 vessels. Seat of the government of Pennsylvania removed from Philadelphia to Lancaster. The militia of the United States estimated at 854,000.

- 2 May 13, Provisional army disbanded. Mississippi territory erected into the first grade of territorial government. Indiana territory formed. Seat of government removed to Washington. Sept. 20, Convention between the United States and France concluded at Paris. Second census reported a population of 5,305,666.
- 1 Contested election between Messrs. Jefferson and Burr, terminated by the choice of Mr. Jefferson for President. July 10, War declared by the United States against Tripoli. Upwards of 200 newspapers now published in the United States.
- 2 April 28, Ohio admitted into the Union as an independent state. July, Louisiana ceded by Spain to France. Intendant at New Orleans shuts that port in October against the commerce of the United States. Merino sheep introduced from Spain into the United States. Military Academy at West Point established.
- 3 April 30, Convention of Paris, by which Louisiana was purchased from France by the United States, for 15,000,000 of dollars. Oct. 31, The United States frigate Philadelphia struck on a rock in the harbour of Tripoli, and was taken. Dec. 20, the French colonial prefect, Laussat, delivered Louisiana to the United States. Columbia college in South Carolina founded.
- 4 Feb. 16, The frigate Philadelphia burned in the harbour of Tripoli, by a body of American seamen, headed by Stephen, afterwards Commodore, Decatur. Aug. The city of Tripoli bombarded by the American fleet under Commodore Preble. Middlesex canal in Massachusetts completed. Brown University, Rhode Island, remodelled. See 1764.

- 1805 June, Treaty of peace between the United States and Tripoli concluded.
- 1806 April 25, John Pierce, an American citizen, murdered by a shot wantonly discharged from the British ship *Leander*, Capt. Whitby. May, Extensive and aggravated captures made by the British of American vessels, for alleged breaches of paper blockades. Nov. The Emperor Napoleon emulates the British in their spoliations on American commerce, by decrees of blockade on paper, and consequent seizure of American property. Treaty negotiated between the United States and Great Britain rejected by the President of the United States, Mr. Jefferson.
- 1807 June 22, American frigate *Chesapeake* attacked in full peace by the British frigate *Leopard*, and a number of American citizens killed or wounded. Nov. 11, issued the famous British orders in Council, prohibiting the trade to France by neutral nations. Dec. 17, The Emperor Napoleon issues retaliatory decrees at Milan, equally affecting neutral commerce. Dec. 22, General embargo laid on American vessels by Act of Congress. William Rose arrives as ambassador from Great Britain to the United States.
- 1808 Congress authorises the President to suspend by proclamation the embargo in favour of one or both nations who should rescind their decrees. The British government, by proclamation, claimed a right to impress their own seamen, wherever found; and refused to repeal the orders in Council.
- 1809 April 12, Congress passes an act to augment the United States army. The Embargo law repealed; but a Non-Intercourse Act passed, forbidding commerce with either Great Britain or France. Treaty between the United

States and Great Britain negotiated with Mr. Erskine, April 23, providing for the repeal of the orders in Council and Non-Intercourse Law, but rejected by the British government and Mr. Erskine recalled. The Non-Intercourse Law renewed against Great Britain. Nov. Mr. Jackson, the British ambassador, dismissed by the President of the United States, for insulting expressions used in his communications.

- 0 May 1, Act of Congress passed to authorise the President of the United States to suspend the Non-Intercourse Law with either France or Great Britain, on condition of a repeal of their respective decrees. Aug. 5, France rescinded the Berlin and Milan decrees in favour of American vessels; repeal to take effect from Nov. 1, ensuing. Third census of the United States reported a population of 7,239,903.
- 1 The British sloop of war, *Little Belt*, on May 16, fired upon the United States frigate *President*, Commodore Rogers, and met a severe castigation for the rashness of her commander. Louisiana authorized to form a state constitution. Nov. 7, Battle of Tippecanoe, on the Wabash, between the Indians, and the Americans commanded by General Harrison; Indians defeated. Congress resolves to augment the army and navy of the United States.
- 2 Jan. Acts of Congress empower the President to raise an army of 25,000 regular troops, to accept the services of volunteer corps to the amount of 50,000, and to put in readiness detachments of militia to the number of 100,000. June 18th, War declared by the United States against Great Britain; and on the 23d of the same month, Great Britain revoked her orders in Council. July 12, United

States army under General Hull, invaded Canada. Fort Mackinaw taken by the British. Aug. 9, Battle of Maguaga, British and Indians defeated. 13, The United States frigate Essex, Capt. Porter, captures the British sloop of war Alert. General Hull, Aug. 16, surrenders Detroit, the Michigan territory, his army, and himself, to the British. 19, The United States frigate Constitution, Capt. Hull, captured the British frigate Guerriere, Capt. Dacres. Oct. 8, British armed brig, Detroit and Caledonia, cut out by a party of Americans from under the guns of Fort Erie. 13, Americans repulsed before Queenstown. 14, General Hopkins repulsed in an attempt on Canada. 17, United States ship Wasp captures the British ship Frolic, and both are subsequently taken by the Poitiers 74. 25, The United States frigate, Capt. Decatur, captures the British ship Macedonian. Dec. 29, Capt. Bainbridge, in the United States frigate Constitution, captured the British frigate Java.

- 1813 General Winchester defeated at Frenchtown, on the Raisin, by the British and Indians, Jan. 13. Feb. 23, The United States ship of war Hornet, takes the British sloop of war Peacock. Mobile, in West Florida, taken by General Wilkinson, April 15. April 27, York in Upper Canada taken by the Americans; General Pike slain in the assault. May 16, Commissioners from the United States to treat with Great Britain, sail for Europe. May, Fort Meigs besieged by the British and Indians, and General Clay defeated in attempting its relief. 27, Fort George, in Canada, taken. 29, British meet a severe *repulse in an attack on Sackett's Harbour.* June 1, United States frigate Chesapeake,

Capt. Lawrence, captured by the British frigate Shannon; the gallant Lawrence fell in the action. 5, Generals Chandler and Winder surprised and taken by the British. 24, Col. Boerstler surprised and taken with his detachment by the British. June 25, Fort Erie taken by the United States troops under General Brown. Aug. 1, British defeated at Fort Sandusky. 14, The British ship Pelican captured the United States brig Argus. September 4, The British ship Boxer taken by the United States ship Enterprise. Sept. 10, The British fleet in Lake Erie defeated and captured by a United States squadron, Commodore Perry. Oct 5, The British army on the Thames, Upper Canada, defeated and in great part captured by General Harrison. Nov. The expedition against Montreal relinquished. Dec. 17, Embargo imposed by Act of Congress. 19, Fort Niagara taken by the British.

- 14 Jan. 22, Creek Indians defeated by General Jackson at Tallapoosa ; and on the 27th, another party of the same nation defeated by General Floyd, at Fort Defiance. March 20, The British frigate Phoenix and sloop of war Cherub, after a sanguinary conflict, capture the United States frigate Essex. 27, The Creeks defeated by General Jackson at Tohopeka. 31, Action at La Cole Mill in Canada. April 21, The United States ship Frolic taken by the British. The United States ship Peacock captured the British ship Epervier. June 28, The United States ship Wasp captured the British ship Reindeer. July 6, British defeated by General Brown at Chippeway; and again, July 25, a similar result at Bridgewater. Aug. 9, British repulsed in an attack on Stonington, Connecticut. 15,

British repulsed at Fort Erie. 24, United States army, composed chiefly of militia, defeated at Bladensburg, and Washington taken by the British. September 1, The U. S. ship Wasp captured the British ship Avon. 11, Battle of Plattsburg, and capture of the British squadron on Lake Champlain by the United States squadron, Commodore M'Donough. 12, Battle of Long Point, near Baltimore, the British defeated. September 17, Sortie of United States troops from Fort Erie, British compelled to raise the siege on the 19th. Oct. 19, British defeated at Lyon's creek. Nov. 7, Pensacola taken by General Jackson. Dec. 23, British having invaded Louisiana, and reached the bank of the Mississippi, eight miles below New Orleans, were attacked by the United States army under General Jackson, and an indecisive though sanguinary battle ensued. 24, Treaty of peace between the United States and Great Britain signed at Ghent. 28, British repulsed in an attack on the United States line below New Orleans.

- 1815 Jan 1, British again repulsed near New Orleans. 8, The British decisively defeated before New Orleans. 15, The frigate United States taken by the British. British army evacuate Louisiana on the 18th. Feb. 17, The Treaty of Ghent ratified by the Senate of the United States. 20, The U. S. frigate Constitution captures the British ships Cyane and Levant. March 23, The British ship Penguin taken by the United States vessel the Hornet. War declared against Algiers. April, Massacre of United States prisoners at Dartmoor, England. June 18, An Algerine frigate of 44 guns captured by the United States frigate Guerriere. Treaty of peace with Algiers.

- 1816 United States Bank with a capital of 35 millions, and a charter for 20 years, established by Congress in April. Oct. Treaty between the Choctaw nation of Indians and the United States negotiated by General Jackson. Dec. Indiana admitted into the Union as a state.
- 1817 Jan. 1, Bank of the United States opened and commences business. Dec 11, The Mississippi territory admitted into the Union as a state. 24, The United States troops seize Amelia Island.
- 1818 April, The Seminoles, a tribe of Creeks, defeated by General Jackson. 22, Massacre of Indians at Chehaw, by order of a Captain Wright. May 1, Trial and execution of Ambrister and Arbuthnot. 28, Pensacola taken by General Jackson. Dec. 4, Illinois admitted into the Union as an independent state. Treaties of commerce with Sweden and Great Britain.
- 1819 Feb. 23, Treaty of Washington between the United States and Spain, providing for the cession of Florida by the latter to the former. Aug. but subsequently rejected by the King of Spain. Alabama admitted into the Union as a state.
- 1820 Jan. 11, Great fire in Savannah. March, Maine admitted into the Union as a state, and Missouri authorized to form a Constitution, which was done in the ensuing June. Nov. Constitution of Massachusetts amended in convention. Fourth census reported a population of 9,637,976.
- 1821 Feb. 19, Florida Treaty ratified. March, Missouri admitted into the Union as a state. July 7, Florida given up to the United States, and organized as a territorial government.
- 1822 Feb. Ratio of representation in the United States House of Representatives fixed at 40 000. See Art. U. S.

CHAPTER II.

GENERAL VIEW.

Taken in its utmost extent, the territory of the United States, as a physical section of the earth, extends from N. lat. $24^{\circ} 27'$ to N. lat. $54^{\circ} 40'$, and from 10° E. to 54° W. lon. from Washington City. It is bounded N. by Cabotia, or British North America; Northwest, by Russian America; West by the Pacific ocean; Southwest by the Mexican Territories; South by the Gulf of Mexico, and Florida or Cuba channel; and Southeast and East, by the Atlantic ocean.

This immense region has a limit in common with Cabotia or British North America, from the mouth of St. Croix river to the Chippewayan mountains,	Miles. 3000
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By an indefinite boundary, from the Chippewayan mountains to the Pacific ocean, say	600
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Along the Pacific ocean, from N. lat. 51° , to 42° ,	625
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In common with the Mexican territories, from the intersection of N. lat. 42° with the Pacific ocean, to the mouth of Sabine river,	2300
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Along the Gulf of Mexico, from the mouth of the Sabine to Florida Point,	1100
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Along the Atlantic ocean,	1800
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Having an entire outline of	<hr/> 9425
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The exact area included within this vast perimeter, has never been very accurately determined, nor do I pretend that the subjoined table will completely solve the problem; but as I used the actual length

and mean breadth of the rhumbs formed by the lines of latitude and longitude, it is probable, that the result is not far from the real superficies of the United States.

No. I.—*Table of the Area comprised in each zone of latitude embraced by the territory of the United States, advancing from south to north.*

Between lats.		Sq. miles.	Between lats.		Sq. miles.
24° and 25°		100	38°	39°	121,000
25	26	2887	39	40	127,194
26	27	8678	40	41	128,000
27	28	9675	41	42	132,696
28	29	9000	42	43	193,250
29	30	26,370	43	44	189,864
30	31	50,124	44	45	193,360
31	32	50,000	45	46	156,272
32	33	50,000	46	47	137,550
33	34	60,500	47	48	117,900
34	35	78,374	48	49	96,420
35	36	83,300	49	50	47,200
36	37	83,300	50	51	30,660
37	38	83,300	Aggregate,		2,257,374

Exceeding by a small fraction the one twentieth part of the land surface of the earth, but within the most temperate latitudes.

The territory of the United States is naturally divided into three great sections; that of the Atlantic slope; that within the great central valley of North America; and thirdly, a slope or inclined plane extending from the Rocky or Chippewayan mountains towards the Pacific ocean.

The already most thickly inhabited part, and the seat of primitive European colonization, is an elongated, but comparatively narrow slope, falling towards the Atlantic ocean. The second section, flanked South by the Gulf of Mexico; North by the interior sea of Canada, and by a wide sweep spreading from the Appalachian to the Chippewayan

mountains, embraces the most important part of the great central valley of the continent. This expanded region is drained in great part by the innumerable confluent of the Mississippi, but having within its limits an important part of the basin of St. Lawrence or Canadian sea. Beyond the Rocky, or Chippewayan mountains, descends the great basin of Columbia or Oregon. The Pacific slope of the United States is still more extensive than that of the Atlantic; but the former continues very imperfectly known, and constitutes a very interesting *Terra Incognita* to stimulate to future discovery.

In every disquisition upon its geography, the relative position and extent of these great natural divisions ought to be carefully kept in view. Contrasted in their general aspect, separated by natural if not by impassable boundaries, and each in itself of great extent, the civil and political history of the United States, must in all future times be modified by features which no human power can essentially change.

The Atlantic slope, if extended beyond the North-eastern limit of the United States, includes the outlet of the St. Lawrence basin, and reaches Cape Charles in Labrador, the extreme Eastern angle of North America; but in the present view, however, we are only concerned with that part, stretching from Florida Point, to the mouth of St. Croix river. This range of the Atlantic coast is the extreme southeast exposure of the continent to which it belongs; and as an inquiry into the remote and proximate causes which produce its atmospheric phenomena, forms an essential part of this view, the reader will find that subject discussed in Chapter X.

A common, but very erroneous opinion, prevails that the great inclined Atlantic plain rises by gradual ascent from the ocean to a chain of mountains, and that, of course, the mountains give rise to the numerous rivers which flow down, and decorate the plain. It is a very remarkable fact, however, that

the Appalachian chain or system of mountains does not form the dividing line between the Atlantic slope and Mississippi basin.* By reference to a good physical map of the United States, it will be seen that the real line of demarcation between the Atlantic streams and those flowing into the Gulf of Mexico ranges obliquely over the Appalachian system. The Atlantic slope, therefore, bounded south-east by the Atlantic ocean, and north-west by the source of its rivers, falls with an unequal breadth and very chequered surface, from north-west to south-east. The interior limit is an indefinite and very inflected line, curving between the river sources, whilst the ocean border is formed by a most beautiful sweep into three immense bays.

Having Capes Hatteras and Florida as the extremes of its chord, and the fine estuaries of St. John's, St. Mary's, Alatomaha, with many other rivers, pouring into its base, stretches a bay, swept by that great ocean river the Gulf stream. The coast of this bay is uniformly low and sandy, with small islands, extending generally parallel to the opposing shore of the continent. The rivers are comparatively shallow at or near their efflux into the ocean. It is much to be regretted, that this bay and the two others which follow it to the north-east, had not received distinctive names; but as this has not been the case, I shall be compelled to distinguish them relatively, as South-western, Middle, and North-eastern.

* To avoid circumlocution, I have designated the Central Valley of the United States, by the name of Mississippi basin, from the most noted of its rivers. The term Basin, in this view, will be also used as generically to denote the entire space drained by a river having its outlet into a sea or ocean, such as the Mississippi, St. Lawrence, or Maumee of Lake Erie; whilst the term Valley, will be used to describe the space drained by a river falling into another; such as the Mohawk, Schuylkill, Shenandoah, or Ohio. Speaking of mountains, the term System will be used generically, and Chain specifically; thus, the system of the Appalachian or Chippewyan, and the chains of Alleghany, Blue Ridge, or Kittatinny.

If we consider the South-western bay as commencing with the northern outlet of the Bahama channel, the length of its chord will be about 600 miles, with a depth from that chord to the mouth of the Alatomaha, of about 200 miles. The Gulf stream in its passage north-east, flows almost exactly along the chord of this bay, and forms in its inner curvature an immense whirlpool. The general causes, courses, and extent of the Gulf stream, will be treated of in Chapter X., as well as the effect of this oceanic river on the climate of the continent of North America.

Cape Hatteras forms a most distinguishing landmark on the oceanic border of the United States. Without an elevation much above the waves which beat with untameable rage against its rocky front, this stormy promontory projects into the Atlantic ocean almost exactly mid-distance between Florida point and Passamaquoddy bay. Sweeping inwards from this cape of tempests, and forming a section of a very elongated ellipse, the Middle bay of the United States extends about 550 miles to the eastern salient angle of Massachusetts, with a depth from its chord to New York harbour of 150 miles. The coast of the Middle bay, like that of the South-west, is generally low and sandy; but the rivers and minor bays of the former assume a very different character from those of the latter. St. John's, St. Mary's, St. Illa, Alatomaha, Ogeechee, Savannah, Edisto, Santee, Pedee, and Cape Fear rivers, all enter the Atlantic ocean, by narrow and very shallow outlets; neither, except the St. Mary's, admitting the entrance of large vessels. With the Neuse and Pamptico, entering into Pamptico sound directly west from Cape Hatteras, commences a new order of rivers. Pamptico sound is followed by that of Albemarle, receiving Roanoke and Chowan rivers, which is again succeeded by that immense recipient the Chesapeake bay, and that again by the wide

estuary of the Delaware, and next, the long and singular tide river or bay of Hudson.

At the efflux of the Hudson, the Atlantic waves almost reach the base of the Appalachian system, but are again repelled by the sandy border of Long Island, which in a distance of 116 miles shelters an inland gulf, differing in character only from the other sounds or bays on the Atlantic slope in having two outlets into the ocean. The outer coast of Long Island may therefore be regarded as the continuation of that of the Atlantic, and what is called Long Island Sound as the recipient of the Houssatonick and Connecticut rivers.

The beautiful and richly variegated bays of Naraganset and Buzzard, close the fine indentings of the Middle bay of the United States, which terminates with the sandy point of Malabar.

Similar to that of the South-west, the chord of the Middle bay is very nearly the course of the Gulf stream, though in its advances to the North-east, that great current increases in width but diminishes in rapidity.

Cape Cod, the eastern extremity of Massachusetts, is a promontory which constitutes another of those geographical limits on each side of which strong contrasts in natural phenomena present themselves. Here again the coast curves rapidly inwards by an abrupt sweep to the south, thence west, and gradually winding to the north-east and finally to the south-east; enclosing on three sides a sheet of water in form of a parallelogram, 200 by 180 miles. Into this north-eastern recipient are poured the rivers Charles, Merrimac, Piscataqua, Saco, Kennebeck, Penobscott, St. Croix or Passamaquoddy, St. Johns, and I might add, the Bay of Fundy.

The North-east bay is rendered distinct by a peculiar character of coast. From causes which will receive a more ample notice in another part of this view, the elevation of the ocean tides increase from

Cape Florida north-eastward, whilst their flow inland is regulated by the particular local features of the coast, or rock formation. In the South-west bay, the tides vary from 4 or 5 to 7 or 8 feet. In the Middle bay, and especially towards its north-east extremity, the height of tide is sensibly augmented; but along the whole shore of the Atlantic ocean, from Cape Florida to Cape Cod, in a distance, following the general curves of the two great bays, of upwards of one thousand three hundred miles, the tides are under 10 feet, except in heavy and long continued south-eastern gales.

Passing Cape Cod, a sudden and hitherto unexplained elevation of the tides is at once perceived. The change is so excessive and rapid, that in Buzzard's bay, the tide rises 9 feet, whilst at Barnstable, on the opposite side of the narrow intervening neck of land, they rise to 18 feet mean height. Advancing to the north-east from Barnstable, the swell increases until in the Bay of Fundy the ocean tides are the most elevated known, rising to from 40 to 50 feet. There may be other causes which contribute to produce such a difference in the Atlantic tides from Cape Florida to the Bay of Fundy, but it is probable that the principal part of the effect arises from the Gulf stream. It will be seen in Chapter X. that the current in the Florida channel is from three to five miles an hour; a velocity continued in the Bahama channel. This counter stream checks the tides; but as the ocean current widens and becomes more slow, the swell falls with more and more force on the continent.

The shores of Cape Cod are low and sandy, but with it terminates the sea-sand alluvial coast of the United States. The high land approaches the ocean, and the bays and rivers of north-east Massachusetts, and of New-Hampshire and Maine, open to the ocean between bold and swelling hills. The harbours of this North-east section of the United States

are numerous, deep, and spacious, and the two extremes of the Atlantic slope, present a complete contrast in scenery and in commercial facility.

Such are the prominent outlines of that coast which meets the wave of the Atlantic ocean, and upon which has been reared the first column of American freedom.

Along the Gulf of Mexico, in a line of 1100 miles, scarce a hill of any perceptible elevation rises to break the dull monotony of the coast; the rivers enter their recipient by narrow and shallow channels, even the outlets of the mighty Mississippi, on no one bar has 13 feet water. The best harbours are bays into which no great rivers are discharged.

To an eye sufficiently elevated and powers of vision strengthened so as to admit a view of the whole territory of the United States, the perspective would present, on the south-east an immense inflected sea line, from the mouth of the Sabine to Cape Cod, of 2400 miles, unbroken and unadorned by any of those strong features which give relief to landscape. Approaching the Hudson, far distant hills would be perceived, but still the ocean spray would continue to have a beach of sand and shells. With the Merrimac the monotonous scenery would cease; more indented and now rising into rounded promontories, the ocean border would be seen richly variegated with sheets of water, intervening between isles now smiling in all the luxury of civilized cultivation. Extend the view inland from the Atlantic ocean and Gulf of Mexico, and one vast and very gently rising alluvial plain would seem emerging from the waters, and spreading to the base of the Appalachian mountains. The ocean plain, first an almost undeviating level, would be found imperceptibly broken into hill and dale; the hills first humble in elevation, but approaching the mountains more proudly swelling into that majesty, which gives so imposing an aspect to many of the interior parts of the United States. But to give still more grandeur to this interesting

picture, the long and irregular chains and ridges of the Appalachian system, would appear stretching from south-west to north-east, through upwards of 1200 miles. Those chains and ridges, however irregular in their individual physiognomy, would be perceived arranged as a whole, with a symmetry which mocks the efforts of art, and again, exhibiting the peculiar phenomenon of constituting the far highest elevation intervening between the Atlantic ocean and Mississippi basin, without being the dividing ridge between the respective rivers of these two great sections of North America. Impressed with the common but erroneous opinion, that the Appalachian chains and ridges are the superlative of hills, and that the Atlantic scope is terminated by the base of that system, the observer would quickly perceive his error. He would discover that the Appalachian system, so far from constituting a dividing river line, that compared with the real fountain boundary, the mountains ranged obliquely; and would appear in some respects as extraneous to the general structure of that part of the continent; and as having been formed at a different period. The mountains would be seen deflecting the courses, but in no single instance as determining the recipient into which their waters are discharged. The river volumes would appear flowing down the mountain vallies, or bisecting the chains at very nearly right angles. This symmetrical inflection in the courses of the rivers, though apparent on both the Atlantic slope and Mississippi basin, is in a peculiar manner evident in the confluent of Chesapeake bay; the Delaware, Hudson, and Connecticut basins.

If a perceptible line was drawn on a good map of the United States, an observer of such a diagram, would be placed relatively as would such a one as I have supposed. Such a map would present the mountains as crossing the river line at an angle of about 30° ; and what is truly worthy of remark, the

river line, from the sources of St. John's of New Brunswick, and Maine, to Florida Point, would appear to obey the inflections of the opposing Atlantic coast. The mountain system, on the contrary, almost touching the ocean on the coasts of New Hampshire, Massachusetts, Connecticut, and New York, penetrates, in its range south-west, more and more deeply into the continent, passing over New Jersey, Pennsylvania, Maryland, Virginia, the two Carolinas, Georgia, and Alabama.

If we receive the preceding data as correct, then are we bound to regard the mountains which compose the Appalachian system, as not only relatively, but specifically and generically distinct from the hills. The former stand prominent, are arranged in order, and are composed of different materials from the latter, which, indeed, are evidently the remains left by river abrasion. I would impress the distinction the more upon the mind of the reader, as it has been from confounding objects so different, that so much error prevails respecting the physical geography of the United States. Confounding the mountain chains with the river hills, again impedes a due conception of the prodigious facilities afforded by the Atlantic rivers to canal and road formation. The rivers have already done, what man could never by any combination of force have effected; torn the mountains to their bases, and made not only natural canals, but afforded the ready routes to roads through those enormous piles of earth and rock. But though less influential on the general structure of the continent, than a casual observation would lead us to suppose, the Appalachian masses constitute very strongly marked features, on an extensive scale, and give a rich finish to the great Atlantic plain. To the eye of the traveller those mountains present an almost infinite variety of landscape. Many who read accounts of foreign scenery, are unaware, that, in a distance as great as from the

Pyrenees to the Carpathian mountains inclusive, the United States afford a succession of natural pictures which, if not so magnificent, are more soft, more easily approached, and really more attractive than Alpine glaciers.

As objects of philosophical research, however, I am reluctantly compelled to observe, that no adequate idea of their relative extent, position, magnitude or number, can be gained by any existing map of the Appalachian chains. No operation which deserves the name of an accurate geographical or geological survey has ever been made of even any state section of this system. In every state map which I have seen, whole chains are omitted; whilst others are so very defectively delineated, as to render the representation deceptive. All therefore, which can be performed in the present state of geographical science, is a general view. Taken under a comprehensive survey of its physiognomy, the Appalachian system comprises an undetermined number of chains, extending in collateral ranges. Each chain is indeed formed of ridges which interlock with each other, and are frequently cut by the rivers. The ridges extend in most instances in the same direction with the chain which they contribute to form. The chains differ very materially in relative elevation and continuity, and the whole system is, with a few exceptions, in a remarkable manner devoid of peaks. No unequivocal appearance of volcanic eruption has been anywhere detected.

If we regard the Appalachian system as a whole, and extend our view from the sources of the Chatahooche and Mobile to those of Connecticut, the mountain system has a range not deviating materially from north-east and south-west; but if we examine the parts separate, we discover some very considerable inflections from the general course. These inflections have given rise to a doubt, whether the chains of the opposite sides of the Hudson

formed parts of one, or were two distinct systems, but a few moments' attention to their respective ranges is sufficient to determine that they are really parts of one system.

In Tennessee, Alabama, Kentucky, and part of western Virginia, the Appalachian chains extend between east and west, and north-east and south-west ; but in central Virginia turn to north of north-east, and thus crossing Maryland enter Pennsylvania in a direction almost north and south. Here again the system bends abruptly to nearly east, and curving through Pennsylvania and New Jersey, winds to north and south, in entering New York. Thus the chains on each side of the Hudson belong to that part of the system comprised by the bend commencing in the north-east part of Pennsylvania. When we regard the chains eastward from the Hudson, we perceive them extending from north to south, and terminating towards the Atlantic ocean ; but if taken in connexion, and due attention paid to the inflections already noticed, the continuity of the system will become evident.

Carrying our view west from the Appalachian chains, a new and variegated landscape opens. The great central valley of North America spreads its widely extended sweep from the Atlantic to the Pacific system of mountains ; falling from the Appalachian by a gentle but broken descent to the Mississippi, and again rising beyond that great stream to the base of the Chippewayan. In its fullest extent, the central valley dips into the Gulf of Mexico, south, and mingles with the frozen marshes of the Arctic ocean, north. Of that part embraced in the United States territory, the Canadian sea flanks it on one side, whilst the Gulf of Mexico closes the landscape on the other ; from the two bounding mountain systems are poured the thousand streams of the Mississippi and those of its confluents. The relative extent of these great sections which we have noticed will be given in another part.

of this view. In order to exhibit to the reader a condensed summary of the comparative heights of the two sections, the following tables were constructed.

Tables Nos. 2, 3, 4, 5, and 6, were in a great part formed from actual survey; the distances are therefore taken along the inflected course of the streams; but the residue of the tables being constructed from estimated elevations, the lines of ascents and descents, are direct air measures taken from point to point. It need hardly be observed, that those formed from observed elements have a superior authority over those formed from simple analogy in the fall of rivers.

No. II.—*Table of the Ascents and Descents up the valley of James River, and thence to the mouth of the Great Kenhawa, by the route of Craig's creek, Sinking creek, and Great Kenhawa.*

Route.	Miles.			Feet.	
Richmond, up James river, to the mouth of Craig's creek		200	rises		925
Up Craig's creek to the mouth of John's creek	49	249	—	345	1270
Highest spring tributary to Craig's creek	8½	257½	—	228	2498
Lowest point on dividing ridge	1	257¼	—	53	2551
Highest spring tributary to Sinking creek	½	258	falls	42	2509
Mouth of Sinking creek	34	292	—	924	1585
Down Great Kenhawa to the mouth of Greenbrier river	55	347	—	252	1333
Bowyer's Ferry	46	393	—	403	930
Kenhawa, at the foot of the Great Falls	21	414	—	341	589
Ohio river, at the mouth of Great Kenhawa	94	508	—	108	481

No. III.—*Table of the Ascents and Descents from tide water in James river, to the mouth of Great Kenhawa, by the route of James, Jackson's, Greenbriar, and Great Kenhawa rivers.*

Route.	Miles.			Feet.	
Richmond, up James river, to the mouth of Craig's creek		200	rises		925
Mouth of Dunlap's creek, above that of Jackson's river	25	225	—	313	1238
Lowest point on dividing ridge	16	241	—	1240	2478
Mouth of Howard's creek in Greenbriar river, near Lewisburg in Greenbriar county	12	253	falls	838	1640
Mouth of Greenbriar river	50	303	—	307	1333
Bowyer's Ferry	46	349	—	403	930
Foot of Great Falls	20	369	—	341	589
Ohio river, at the mouth of Great Kenhawa	94	463	—	108	481

These two routes were surveyed by order of the Virginia Board of Public Works, in order to determine the practicability of forming a canal communication between James river and the Ohio, by the valley of Great Kenhawa; and were inserted here with a view to illustrate the relative elevation of the Atlantic slope, the mountain valleys, and that of Ohio. When treating on the climate of the United States in Chapter X., the data on which the tables are founded, will be again referred to, as illustrative of the meteorological phenomena, depending on difference of elevation.

No. IV.—*Table of the ascents and descents, from tide water in Potomac river at Georgetown, to lake Erie at the town of Cleveland, by route of Potomac, Yonghiogany, Monongahela, Ohio, Big Beaver, and Cayahoga rivers.*

Route.	Miles.			Feet.	
Georgetown to the great falls - - -	12	rises		143	
Harper's ferry - - -	40	52	—	39	182
Shenandoah falls - - -	5½	57½	—	43	225
Cumberland - - -	130½	188	—	312	537
Mouth of Savage creek -	31	219	—	446	983
Summit level - - -	14	233	—	1503	2486
Mouth of Deep creek into Yonghiogany river - -	16	249	falls	342	2144
Down Yonghiogany river to the village of Smythfield on the United States road	22½	271½	—	739	1405
Connellsville - - -	37½	309	—	507	898
Mouth of Yonghiogany river	40	349	—	87	811
Pittsburg - - -	18	367	—	11	800
Mouth of Big Beaver river -	30	397	—	106	694
Up the latter to the foot of the falls - - -	1½	398½	rises	12	706
Head of the falls - - -	2½	401	—	44	750
Warren - - -	50	451	—	104	854
Summit Level between the sources of Big Beaver and Cayahoga rivers - -	10	461	—	53	907
Level of Lake Erie at Cleveland, mouth of Cayahoga river - - -	60	521	falls	342	565

No. V.—*Table of Ascents and Descents, from the level of tide water in Delaware river, to the level of Lake Erie at Buffalo, by the route of the Schuylkill, Union Canal, Susquehanna, and Chemung or Tioga rivers, Newtown creek, Seneca lake and outlet, and the Grand Canal of New York, from Montezuma to Buffalo.*

Route.	Miles.			Feet.	
Philadelphia to Reading -		55	rises		186
Summit Level between Tulpehocken and Swatara -	34	89	—	310	496
Susquehanna, at the mouth of Swatara - - -	34	123	falls	220	276
Harrisburg - - -	13	136	rises	10	286
Sunbury - - -	50	186	—	200	486
Wilkesbarré - - -	60	246	—	100	586
Tioga Point - - -	60	306	—	189	773
Newtown - - -	20	326	—	51	826
Summit Level between Tioga river, at Newtown, and Seneca lake - - -	7	333	—	59	885
Head of Seneca lake - -	13	346	falls	445	440
Outlet of Seneca lake - -	35	381	—		440
Montezuma on the Great Canal - - -	20	401	—	69	571
Commencement of Rochester level - - -	63	464	rises	126	497
Along Rochester level to the locks at Lockport - -	65	529	—	68	565
Along Lake Erie level into Lake Erie - - -	31	560	—		565

No. VI.—*Table of the Ascents and Descents, from tide water in the Hudson river at Albany, to the level of Lake Erie, by the route of the Great Western Canal of New York.*

Route.	Miles.			Feet.	
Albany to Schoharie creek		42	rises		286
Rome level at Herkimer	28	70	—	132	418
Along that level	65	135	—		418
Montezuma	38	173	falls	45	371
Lyons	24	197	rises	61	432
Rochester level	58	255	—	65	497
Along that level to Lockport and Lake Erie level	66	321	—		497
Along the latter level to Lake Erie	31	352	—	68	565

No. VII.—*Table of the Ascents and Descents, along a meridian 3° lon. W. from Washington city, and from tide water in the Atlantic ocean, to the mouth of Stono river, due N. to the margin of Lake Erie.*

Route.	Miles.			Feet.	
To intersect the line of Table No. II. at the mouth of Jackson's river, N. lat. 37° 49'.		361	rises		1238
Summit of the Appalachian system	25	386	—	1240	2478
Confluence of the Monongahela and Cheat rivers, about one mile within the southern boundary of Pennsylvania	105	491	falls	1578	900
City of Pittsburg	53	544	—	100	800
Summit level between the sources of French creek, and the small streams flowing into Lake Erie	112	656	rises	1600	1400
Level of Lake Erie	8	664	falls	835	565

No. VIII.—*Table of the Ascents and Descents along a meridian 12° lon. W. from Washington, and commencing on the margin of the Gulf of Mexico, near the S. E. pass of the Mississippi, and thence due N. to the southern margin of Lake Superior W. from Point Ke-weena.*

Route.	Miles.			Feet.	
To the junction of the Ohio and Mississippi rivers, at N. lat. 37°; 12° W. from W. C. Illinois river at a point between the influx of Vermillion river and Portage lake	542		rises		321
Ouisconsin river	300	842	—	80	401
Summit level between the sources of the Ouisconsin and those streams which flow into Lake Superior	200	1042	—	760	1161
Margin of and level of Lake Superior	130	1172	—	450?	1611
	100	1272	—	970	641

If another line was supposed extended from that of No. 8. into Lake Michigan, it would be found from its highest ascent, that no part of the intermediate space from the mouth of the Mississippi to the level of Lake Michigan, rose seven hundred feet above tide water; disclosing the very important fact, how far nature has went in advance of art in uniting by water the two great basins of Mississippi and St. Lawrence.

No. IX.—*Table of the Ascents and Descents along a meridian line drawn through the City of Mexico, lon. 22° W. from Washington City, commencing on the margin of the Pacific Ocean N. lat. 16° 38', in the Bay of Pasahualco, of La Puebla, and thence due N. to the River Missouri.*

Route.	Miles.		Feet.	
From Pasahualco to the city of Mexico, N. lat. 19° 26'	194	rises	7460	
Montezuma river, near Tecozantla - - -	80	274 falls	500?	6960
Panuco river, about 60 miles above its efflux into the Gulf of Mexico -	120	394 —	6900	60
Rio Grande del Norte, about 150 miles following the meanders above its mouth	325	719 rises	200?	260
Country contiguous to St. Antonio de Behar, N. lat. 29° 36' - - -	179	898 rises	50	310
Red River of the Gulf of Mexico, or Rio Colorado of Texas, at N. lat. 32° -	165	1063 —	120	430
Red River of the Mississippi	100	1163 —		430
Arkansas river, at N. lat. 38° 30' - - -	326	1489 —	470	900
Kansas river, at N. lat. 39°	35	1524 —	50	950
Platte river, N. lat. 40° 10'	80	1604 —	60	1010
Missouri river, near the mouth of Jaques river, N. lat. 43°	160	1764 —		1010

It may be premised, that except the general level of the valley of Mexico, the ascents and descents in table No. 9, were not taken from actual admeasurement, but were estimated by analogy from the length of the streams above their recipients, and may, I presume, be taken as sufficiently correct to answer any practical purpose, and if so received

lead to very important conclusions. By reference to a map of North America, it will be perceived that meridian 22° W. from Washington City, ranges over the western territory of the United States, from Red river to the Missouri 600 miles, with a difference of level of 580 feet. It is probable, that much of the spaces between the rivers are elevated several hundred feet above the level of the streams: but the relative numbers in the table will serve for a comparative sketch of the height of that part of the United States. Two reasons combined to give a preference to the meridian 22° W. from Washington City. First, this line passes over the city of Mexico, and consequently, over the highest table land yet inhabited by civilized people in North America. The elevation of the Mexican valley has also been determined by scientific observation, and the line of the table extending thence N. depresses to near the level of the Gulf of Mexico, and in its ultimate range divides into two very nearly equal portions, the immense inclined plain between the Mississippi river and the Chippewayan mountains. In the second place, meridian 22° W. from Washington City divides the continent of North America into two not very unequal sections, and affords highly valuable points of reference when treating on climate.

Though not particularly connected with the subject before us, I may observe, that this geographical line exhibits to view the vast extent of the United States; as the point where it intersects the Missouri is very near mean distance between Cape Hatteras and the mouth of Columbia river. There is again another circumstance which gives interest to that part of North America, where long. 22° W. from Washington City crosses the Missouri; it is not far removed from the central part of the continent, and very nearly equidistant, about 1000 to 1200 miles from the Pacific and Atlantic oceans, and from the Gulf of Mexico and Hudson's Bay.

No. X.—*Table of the Ascents and Descents along a curve of the earth from Cape Hatteras to the mouth of Columbia river. These two points are respectively, at N. lat. 35° 15', and lon. 1° 30' E.; and at N. lat. 46° 15', and lon. Washington city 47° 53' W., bearing from each other by an angle deflecting from the meridians 73° 34', distant 2333 geographic, or 2702½ statute miles, exceeding one-tenth of a great circle of the earth.*

Route.	Miles.			Feet.	
Commencing on the mean level of the Atlantic ocean at Cape Hatteras, and thence to the S. E. foot of the Blue Ridge, at the middle sources of the Roanoke		280	rises		1200
Summit of the Blue Ridge	5	285	—	1000	2200
Kenhawa river in the Great Valley between the Blue Ridge and Alleghany	30	315	falls	615	1585
Ohio river near Louisville	300	615	—	1242	343
Wabash river above Vincennes	110	725	rises	20	363
Illinois river, at N. lat. 40°	175	900	—	137	500
Mississippi river near the mouth of Le Moine river	60	960	—	20	520
Missouri river, above Council Bluffs	240	1200	—	350	870
Foot of the Chippewayan mountains on the sources of Yellow-stone river	600	1800	—	1000	1870
Summit of the Chippewayan table land	20	1820	—	1500	3370
Tide water in Columbia river	780	2600	falls	3370	
Mouth of Columbia river, and margin of Pacific ocean	102	2702			

The preceding 9 tables might be deemed sufficient to exhibit a view of the relative elevations of the great sections of the United States; but I have concluded, in order to make the comparisons still more comprehensive, to add another, comprising the Basin of St. Lawrence. The latter basin or Canadian sea, is peculiar, not alone in the United States, but in America; it has, indeed, but one similar on earth, that of the Black Sea. In one important feature the Canadian basin stands alone; it rises by abrupt steps and not by gradual ascent.

The elements from which table 11 was constructed, were drawn from either actual survey or observation. From the Atlantic ocean to Lake Erie, the results are from survey; the residue were taken from Mr. Schoolcraft's Tour from Detroit to the Sources of Mississippi. This table may be regarded therefore as giving an accurate view of the relative elevation of the interesting region of which it treats.

No. XI.--Table of the Ascents and Descents from the Oceanic level in the Gulf of St. Lawrence, up that stream and through the Canadian Lakes, and over the intermediate country by the route of St. Louis, and Sandy Lake rivers, to the Mississippi, and up the latter to its source.

Route.	Miles.			Feet.	
Up St. Lawrence river to the head of tide water -		456			
Lake Ontario level -	200	656	rises	231	
Lake Erie level -	175	823	—	334	565
Lake Huron level -	340	1165	—	31	596
Lake Superior level -	240	1405	—	45	641
Mouth of St. Louis river into the western angle of Lake Superior -	380	1785			641
Up St Louis river to the S. W. Company's House	24	1809	—	4	645
To the head of Grand Portage	11	1826	—	228	873
To the foot of Portage au Coteaux -	6	1826	—	18	891
To the head of Portage au Coteaux -	2	1828	—	42	933
To the Summit level, or Savannah Portage -	100	1928	—	261	1194
Down Savannah river to the level of Sandy Lake -	21	1949	falls	24	1170
Mouth of Sandy Lake into the Mississippi -	20	1969	—	36	1134
Source of the Mississippi	100	2069	rises	160	1294

An adequate attention to these profile tables, will tend to prepare the reader for a more due conception of the great inflections in the surface of the United States. As respects the most prominent feature on the Atlantic side of the continent, the Appalachian system of mountains, we find it rising into masses in central Virginia, to an elevation of about 2500 feet, and in the Peaks of Otter to about

4000 feet above the ocean tides, and falling by a very gradual descent to the sources of the Mohawk, where the highest table land is only 420 feet. The entire system penetrated by the ocean tides through the Hudson valley, extends in regular chains, and is altogether, perhaps, the most uniform mountain mass of the earth. It is not, as I have already observed, distinguished by any volcanic or other very elevated peaks, and in no one ridge rises to the region of perpetual snow.

The component materials are arranged with an almost utter contempt of geological formation as it is called.* As far as yet carefully examined, the Appalachian system remains undefined at its two extremities, and still more so along the sides; but taken in the fullest extent, over which the mountain chains rise to evident notoriety, from Alabama to Maine, and including all its lateral chains, the Appalachian system extends in length 1200, with a mean width of 100 miles, embracing an area of 120,000 square miles. But a small part of this superficies is, however, actually covered with mountains. The chains vary in number from six to twelve, eight would be perhaps nearer a mean, and 4 miles an adequate allowance for their bases. This would suppose about one-third of the area occupied by mountain chains, and leave two-thirds to the intervening vallies.

* It is with much reluctance I am compelled to use a term so vague and difficult in its application. Before a specification could be made of the geological structure of this great system, a previous and very skilful survey would be requisite. Such a survey has never yet been made, and in the existing state of our knowledge, as far as formation is concerned, the great mass of the system is arranged into inclined stratified rocks, whilst the two extremities are primitive. Some of the more humble northwestern chains reach into the central floetz or horizontal formation, and some of the southeastern touch the Atlantic sea and alluvion. In many of the mountain vallies the formations are intermingled in such wild confusion as to put all casual observation at defiance to trace their outlines, indeed such outlines have an existence in nature.

There are, it may be observed, two kinds of valleys in the Appalachian system; one the intermediate spaces between the chains; the other the river vales. These two crossing each other in all directions, and affording a never ending variety of rock, water, hill, and mountain, with spreading alluvial plains, contribute to give to this part of the United States an indescribable attraction to the traveller.

In respect to the two kinds of valley, the Hudson river or bay stretches a line of demarcation. South-west from that remarkable tide valley, the rivers generally flow along the mountain range, or directly at right angles; on the contrary, east from the Hudson, the rivers generally flow along the mountain vallies.

If we disregard the mere ridges, and examine the plateau or table land on which they stand, we discover a declivity falling from a mountain nucleus, from which flow James and Roanoke rivers into the Atlantic ocean, and Tennessee and Kenhawa into the Ohio, whilst a third series of streams are poured towards the Gulf of Mexico. To the north-east this plateau sinks slowly, and at its extremes differs in elevation about from 1600 to 1800 feet.

The depression of the Mohawk valley near Rome, is not the lowest pass through the Appalachian system. The tides in the Hudson pass the primitive ledge, and flow into the interior of the continent to the verge of the central secondary above Albany. From the latter place the Hudson valley is continued, by one of the most remarkable features in nature. What is specifically called the Hudson basin, is in reality only a part of an immense glen, extending from the Atlantic ocean, at New York harbour, in a direction a little east of north into St. Lawrence river, at N. lat. $46^{\circ} 03'$. This chasm is occupied by the Hudson from Sandy-Hook to Glenn's Falls; *thence for 21 or 22 miles by an intermediate table land to the head of Lake Champlain, and for the resi-*

due of its length into St. Lawrence, by Lake Champlain and its outlet the Richelieu or Chambly river; and inclines from the meridians only 52°, in a direct distance of 387 miles. The highest summit level between Hudson river and Lake Champlain is only 140 feet above tides in the former. Thus we are taught that an elevation of 141 feet in the Atlantic level would insulate the entire space between the Atlantic ocean and Hudson and St. Lawrence rivers, and in the actual state of nature affords a facility of canal construction unequalled on this continent.

We ought not to pass over, without particular observation, the range of primitive rock over which so many of the rivers of the Atlantic slope are precipitated. The underlying primitive strata, exposed to the day by the rivers at Patterson, New Brunswick, Trenton, Philadelphia, Wilmington, Baltimore, Ellicott's, Georgetown, Richmond, Petersburg, and many other places more south-westwardly, reaches the ocean in the vicinity of New York, and skirting Long Island Sound, continues north-eastward and forms the base of the indented shores of Connecticut, Rhode Island, Massachusetts, New Hampshire, and Maine. Though only discoverable at points, where either the ocean or rivers have laved its base, this lengthened and evidently continuous range of rock strata constitutes a very definite physical limit. This inflected line, from New York to the Mississippi, is marked at distant intervals by falls or rapids in the bed of the streams. It is thus exposed near Patterson in the Passaic; near New Brunswick in the Raritan; near Princeton in the Millstone; in the Delaware at Trenton; in the Schuylkill near Philadelphia; in the Brandywine or Christiana in the vicinity of Wilmington; at the Falls of Gunpowder; in the neighbourhood of Baltimore; at Ellicott's on the Patapsco; at Georgetown in the Potomac; Fredericksburg on the Rappahannock; Richmond on James river; Munford

Falls on the Roanoke; the Neuse at Smithfield; Cape Fear river at Averysboro'; Pedee near Rockingham and Sneadsboro'; the Wateree near Camden; the Congaree at Columbia; and the junction of the Saluda and Broad rivers; the Savannah river at Augusta; Oconee at Milledgeville; the Oakmulgee at Fort Hawkins or Macon; Flint river at Fort Lawrence; Chattahooche at Fort Mitchell; Talapoosa at Tallossee; Coosa near its junction with Talapoosa; Tombigbee near Fort St. Stephens; and is supposed to reach and underlay the Mississippi between Natchez and Big Black river. Extending beyond the Mississippi, I have myself traced this natural limit in Ouachita river, immediately below the mouth of Bœuf river, and in Red river at the Rapids near Alexandria.

It must not, however, be understood that the ledge we have been surveying is every where actually composed of primitive rock. In Alabama, Mississippi, and Louisiana, such is not the case; it is there in most instances a loose species of sandstone; but whatever may be its components, it serves to trace a great natural line between two very different regions. From New York to the Mississippi, with the exception of the comparatively elongated peninsula of Florida, the rock ledge follows the general inflections of the coast, and in the Atlantic rivers, in most instances, arrests the tide. Although the change in the physiognomy of the earth above and below these falls, is not always distinctly defined by a rapid transition near the line of contact, yet a short distance on either side presents a contrast in vegetation, and in the face of the country. Below the river falls the aspect becomes more and more monotonous, until the whole sinks to a level scarcely more broken in many places than is that of an ocean in a calm. The rivers except from the tides are without current, or flow gently. Marshes overflowed by the tides, and land floods, are extensive near the

sea-coast. Above the falls all is different, and not only to the mountain bases, but in their expansive vallies, the hills meet the traveller's eye in a succession of form and elevation, round, bold, and swelling in their contour. The rivers wind through vales, rich, variegated, and gently undulating, and now under the hand of culture, smiling in all the gaiety of field, garden, orchard, and meadow. This fine hill tract spreads, if I may use the expression, round the Appalachian masses, and extends from the mouth of St. Lawrence to near that of the Mississippi. It comprises the best peopled and cultivated part of the northeastern, middle, and southern States, and the finest sections of Canada. It may be doubted whether, on so large a scale, the Appalachian region is excelled by any other on earth, in all that nature can bestow to sweeten civilized life and to give scope and vigour to the human intellect.

If the reader will turn to the sketch of the rock ledge under review, he will perceive that, in the progressive history of improvement, the largest and most wealthy cities in the United States have risen on its margin; it has therefore become a great moral and political boundary. Along this line, at present, and through all future ages, will the commerce of Europe come in contact with that of the interior regions of North America.

In this chapter has been given the extent, position, and general features of the United States. The inflections of its surface have been subjected to as rigorous delineation as the existing state of our topographical researches will admit. I would have been rejoiced that more perfect data had been within my reach in respect to the regions towards the Pacific, but those wide spread tracts have been too defectively explored to admit of much detail. What is known with certainty will be introduced in its proper place.

Before closing this subject it may be well to say

tice a very common, but certainly a very doubtful, hypothesis. The primitive beauty and attractive varieties of the earth's surface have been themes of poetic description, but are such delineations founded on rational induction from known phenomena? On the contrary, as far as I have had means of observation in the United States, it has always appeared to me, that in very remote ages, the face of the earth was, compared with the present, much more monotonous, the river vales more obstructed, fenny, and marshy; and those genera of vegetables, indigenous to such moist flats, greatly more prevalent; but as rivers abraded their banks and deepened their channels, the superabundant earth was slowly removed and deposited as alluvion near their mouths. New tracts were formed along the oceanic border, whilst the interior was drained. Thus was gradually formed that hill and dale physiognomy, so delightful to the eye, and so well adapted to become the residence of intellectual man, and which spreads, I might almost say, interminably over the United States, but particularly round the Appalachian system of mountains.

CHAPTER III.

GEOGRAPHICAL VIEW OF THE SOUTHERN SECTION OF THE ATLANTIC SLOPE OF THE UNITED STATES.

IN the progress of our survey we have examined the general position, direction, and extent of the Atlantic slope; we have reviewed its three great divisions of mountain, hill, and alluvion. The elevation, extent, and most striking peculiarities of each section have been noticed; but before proceeding to a detailed view of the rivers and mountains, I have introduced some remarks on the peculiar physical construction of the peninsula of Florida. It may be observed, that Long Island and the sound which separates it from the continent are only distinguished from other islands and sounds, along the Atlantic coast, by the single circumstance of the sound having two outlets, and of course, insulating that strip now known by the descriptive name of Long Island.

The latter, in every other general feature, has a very strong resemblance to those four peninsulas; that of southern New Jersey, almost insulated by tide water in the Delaware bay and river, and by Amboy bay, and Rariton river; that of Cape Cod, still more nearly cut from the mainland by Buzzard's bay and the deep south-west indenting of Barnstable bay; thirdly, that extensive tract encircled within a few miles by the tides of the Delaware and Chesapeake bays; and fourthly, the great peninsula of Florida.

If our maps are even tolerably correct, Florida is connected with Georgia, by a flat country, &c.

which the tides probably once flowed, if the hypothesis of the abasement of the Atlantic level is founded on fact. The tables of ascent and descent given in Chapter I. are calculated on the supposition of uniform level along both coasts of America; an assumption, however, which demands considerable modification. From the circumstance of the Gulf stream flowing out of the Gulf of Mexico, into the Atlantic ocean, it is demonstrated, that the former is elevated above the latter, and that Florida rises as an immense wing dam, confining the water of the Gulf of Mexico from falling with irresistible weight into the Atlantic ocean. From this inequality of level, if ever a canal is opened over Florida, the locks on the Atlantic side must exceed those on that of the Gulf of Mexico.

The entire peninsula seems based on shell limestone of comparatively recent formation, and of every degree of induration, from compact building stone, to loose hillocks of sand and shells. The central part of the country rises into hills of no great elevation, resting on the calcarious strata, and from which the surface slopes imperceptibly towards the contiguous ocean and gulf, and also towards the great body of the continent. It is an interesting subject of inquiry, whether an artificial channel could not be opened from the Gulf of Mexico into the Atlantic ocean, with a current from the former into the latter recipient? As it is situated, Florida greatly modifies the maritime phenomena of the United States, and may admit, it is probable, of an improvement or change by the hand of man, which may, though to a very limited degree, influence the course of one of the greatest aquatic currents on the globe, the Gulf stream.

Hitherto we have been examining the solid structure or skeleton of the Atlantic slope, but we now *are to traverse its rivers, those channels of living water, which give activity, beauty, and elegance*

to the face of the earth, and without which, barbarism, gloom, and poverty would prevail for ever.

The rivers of this region are divided by the hand of nature into two sub-systems, by the lengthened tide valley of the Hudson. These two divisions I shall place before the reader in the order I have already pursued with the previous survey, advancing from south to north.*

In this order St. John's river, of Florida, appears first. On the principles I have adduced, this river partakes much more of the character of an inlet or sound, than that of a river in the real acceptation of the latter term. In Tanner's map, the extreme southwestern sources of St. John's are laid down at N. lat. $28^{\circ} 15'$, from whence by the name of Ocklawaha it flows north-west eighty miles, and then curving gradually to an east course, unites with the St. John's proper at N. lat. $29^{\circ} 21'$. The latter branch rises at N. lat. $28^{\circ} 38'$, and pursuing a north-west course of about 60 miles, receives the tributary I have noticed. Below their junction the united water flows by a very tortuous course 130 miles, falling into the Atlantic ocean at N. lat. $30^{\circ} 19'$, long. $4^{\circ} 36'$ W. from Washington City. Composed of lakes and interlocking inlets, both branches of St. John's appear on the map with a strong resemblance to other narrow sounds along the American coast. The source of the St. John's proper or eastern branch rises within a few miles from the Atlantic ocean, and flows into the peninsula. The intermediate strip between the river and the ocean of about 120 miles long, and with a mean width of from 20 to 25,

* It may be noted, that in estimating the length of rivers, their courses are in this view taken comparatively, and their minute bends disregarded. Much distortion is frequently given to a country by estimating the meanders of rivers; and it is from this cause, that the rivers of America are almost uniformly represented longer than they are in fact, when compared with the streams of the other parts of the earth.

is flat, in part marshy, and otherwise presenting the common traits of those insular tracts scattered along the coast of the United States.

The St. John's is rather important from the singularity of its structure than from its value either as a commercial basin, or a tract whereon a dense population could find subsistence. Its bar affords 15 feet water at the best tides, and within the bar, the river channel rather exceeds that depth to Lake George 130 miles above the mouth. Lake George is one of the enlargements of St. John's proper, above the entrance of Ocklawaha ; and with a depth of 12 feet, is about 18 miles by 12 in extent. Above Lake George the river again rather deepens and is navigable 40 miles higher. The Ocklawaha is also navigable some distance above its mouth, but both branches have more the appearance of irregular canals than rivers.

From the outlet of St. John's, in a distance of above five degrees of latitude, to the extreme southern point of the peninsula, no river of any magnitude flows from the interior, nor does the coast afford harbours in any proportion to a distance of 370 miles. From every data we have yet procured, the far greater part of the surface of southern Florida, is open, flat, and marshy ; even the sources of St. John's are undefined, and what is a striking fact in the natural history of that river, though a fresh water stream at its mouth, its waters are often rendered brackish near its head, from the waters of the Gulf of Mexico being driven by the winds into the lagoons which intersect the intervening morasses.

St. Mary's, with the inconsiderable river Nassau between, follows St. John's. The St. Mary's, St. John's, St. Illa, and Alatomaha, afford one amongst many other examples of a similar nature in the United States. These rivers in their inflections *correspond to each other with an exactness, which warrants the induction*, that such uniformity must

have arisen from some general cause, existing in the country over which those streams flow.

The sources of St. Mary's have been traced to above N. lat. 31° . flowing thence with a most tortuous channel into the Atlantic ocean, which it enters directly west from the pass between Amelia and Cumberland islands, after an entire comparative course of 110 miles. The sources of St. Mary's interlock with those of Suwanne and St. Illa rivers. General course from west to east, entering the ocean at N. lat. $30^{\circ} 42'$, long. W. C. $4^{\circ} 37' W$.

St. Mary's river is of importance from the depth of water on its bar, having twenty feet at mean tides, more than is found in any other channel along the Atlantic coast of the United States, south-westward from the Chesapeake.

St. Andrew's sound receives the St. Illa river almost exactly on N. lat. 31° . Of little importance as channel of commerce, the St. Illa, in respect to space drained, is a much more considerable river than St. Mary's. The St. Illa rises at N. lat $31^{\circ} 2'$, long. W. C. $6^{\circ} W$., interlocking sources with the Suwanne and lower small branches of the Oculmulgee, and drains some of the south-eastern counties of Georgia.

The St. Mary's in its lowest part separates Florida from Georgia, draining part of both, but the St. Illa basin is entirely within the latter state.

From Florida point to the mouth of St. Mary's the coast of the Atlantic ocean inclines westward of a meridian one degree and a half of longitude in five degrees of latitude, but at the mouth of St. Mary's the coast assumes an inclination a little east of north, 45 miles to the opening of Alatomaha sound. As in almost every other instance of the rivers of this part of the Atlantic coast, the great volume of the Alatomaha enters the ocean between the salient points of two coast islands. St. Simon's and Sapelo islands bound the various outlets of the Alatomaha, the Dory inlet be-

ing merely the north-east entrance into the port of Darien, situated on one of those outlets.

Advancing along the Atlantic shore from Cape Florida, the Alatomaha is the first stream, the remote sources of which are drawn from the south-eastern spurs of the Appalachian system. It is formed by two branches, the Oconee, and Oakmulgee, of nearly equal length and volume. Both confluents rise in Hall county, Georgia, N. lat. 34° , long. W. C. 7° W., and flowing nearly parallel to each other at a mean distance of 40 asunder, 160 miles, the western branch of the Oakmulgee turns by a gradual bend to north-east, joins the Oconee at the point where Telfair, Montgomery, and Tatnall counties have a common angle, N. lat. 32° 1', long. 5° 33' W. Below the union of the two great branches, the Alatomaha, now a spacious stream, inflects a little east from the general course of the Oconee, and after a comparative distance of 90 miles, is lost in the Atlantic ocean at N. lat. 31° 19', long. W. C. 6° 22' W., between Glynn and McIntosh counties.

The sources of the Alatomaha interlock with those of Savannah, Ogeechee, Cambahee, and St. Illa, flowing into the Atlantic ocean, and with those of Chatahoochee, Flint, and Suwanne, entering the Gulf of Mexico. As a navigable basin the Alatomaha has 14 feet water on its bar, and the depth is increased within and for some distance above the port of Darien. Boats of 30 tons are navigated up the Oconee to Milledgeville, and an equal distance up the Oakmulgee.

From the mouth of St. Mary's to Alatomaha sound, the Atlantic coast is seen gradually curving eastward; at the latter sound, the eastward curve is increased to very nearly north-east, which course is maintained to the efflux of Savannah river. In a distance of 55 miles, the coast is decorated and broken by Sapelo island and sound; St. Catherine's is-

land and sound ; Ossabow island and sound ; Was-saw island and sound; and finally, Tybee island, at the entrance of Savannah river.

In the intermediate space between the Alatomaha and Savannah, Ossabow sound receives the only river, the Ogeechee. This small stream is formed by two unequal branches, the Ogeechee and Camouchee. The Ogeechee proper rises in Greene county, in Georgia, and flowing thence S. S. E. 160 miles, receives the Camouchee from the right at N. lat. 32° , continues 15 miles farther, and opens into Ossabow sound. The extreme eastern angle of Ossabow island is at N. lat. $31^{\circ} 50'$, long. W. C. $4^{\circ} 2' W$.

Our survey now brings us to the review of a river remarkable as forming in all its course from the Appalachian mountains to the Atlantic ocean, in a distance of 250 miles, and in a course of S. S. E., a boundary between Georgia and South Carolina. The general course of the Savannah is in an unusual manner direct, and compared with its length, drains the least area of any river on the Atlantic slope. The Savannah river has 17 feet on its bar, and is navigable with large vessels to the city of Savannah, and for river vessels to Augusta.

We may here pause on our course, and return to a summary review of that region comprised in the three basins of Alatomaha, Ogeechee, and Savannah. Taken together those three basins cover an area of 27,300 square miles. Extending from the verge of the central secondary formation, crossing the primitive, and terminating in the mixed river and oceanic alluvion, this portion of the United States comprises the greatest difference of climate and vegetable production to be found within any equal superficies. The surface presents all the variety of scenery, from the monotonous oceanic border, to the elevated, rugged, and variegated mountain ridges.

In the higher sources of the Savannah, we are led to the first point where the fountains of the Atlantic slope and those of the Mississippi approach. Here the branches of the Tennessee, and those of Savannah interlock, at N. lat. 35° , long. W. C. 6° W. on a plateau at least 1500 feet above the Atlantic level; and as that height in feet is a fall equivalent to four degrees of lat., consequently, the temperature of the region before us presents all the varieties found in the opposing ocean margin in extremes of seven degrees of the meridian.

With the Atlantic border of Georgia commences the real tropical climate of the United States. It will be shewn when we are expressly discussing the subject of climate, why the temperature is so much lower on any given latitude upon the shores of the Atlantic ocean, than on the banks of the Mississippi; and why the zone of tropical vegetables is so much more southward on the former, than on the latter section of the American continent. As the mouth of the Savannah river is a point of separation in some manner between two climates, it may be well to remind the reader that N. lat. 32° , and long. 4° W. from W. C. intersect about 5 miles almost directly west from the bar.

The Atlantic coast, curving eastward from the mouth of St. Mary's, assumes above Savannah bar a general course, but with partial inflections, of N. $56^{\circ} 40'$ E., which is continued to Cape Hatteras, within a small fraction of 400 miles. With this great change in direction, the character of coast from Cape Florida, is sustained by the far greater part of the maritime border of South Carolina, and along the latter the intricacy of inlets and islands is increased. Jones', Burtle, Dawfuskie, and Hilton islands, succeed each other, in a distance of 20 miles from Savannah bar to Port Royal entrance. This latter opening, designated Broad river in the interior of

the country is the estuary of a number of small creeks, the principal of which the Coosawhatchie rises in the southern part of Barnwell district, flows thence into and crosses Beaufort district, gradually widens near the ocean, where it changes to the name of Broad river, and finally enters the Atlantic by Port Royal entrance. The entire length of the Coosawhatchie and Broad rivers united is about 70 miles, over a country uniformly flat, and in a great part marshy, receiving the Atlantic tides to near its interior extremity. The port of Beaufort, on one of the numerous inlets which wind through this labyrinth of creeks and islands, is the commercial depot for Port Royal entrance. The port stands 14 miles north, and within Hilton head the southern and salient point of the entrance. Hilton head is at N. lat. $32^{\circ} 12'$, long. W. C. $3^{\circ} 41' W$.

St. Helena sound, the most spacious opening from Cape Florida, in a distance of almost five hundred miles, is the recipient of two considerable streams, the Combahee and Edisto rivers, and also of some creeks and inlets of lesser note. It is one of the peculiarities in the history of human society in the southern states, that no city of great consequence has risen on the large rivers, if we except New Orleans and Savannah. An explanation of this anomaly is to be sought in the character of the rivers themselves. Shallow and intricate, their capacity of conveyance bears no proportion to their apparent magnitude. St. Helena sound is, including the mouth of south Edisto river, near eight miles wide, and narrowing inland ten or twelve miles, terminates by the influx of Ashepoo, Combahee, and Coosaw rivers; the latter an inlet from Broad river. With all this appearance of a spacious series of havens, the depth of water forbids the rise of any commercial depot of much consequence.

It has been already noticed, that St. Helena sound at its north-east angle receives one branch of Edisto

to river. The latter composed of two confluent, north Edisto, and south Edisto, both rising in Edgefield district, and flowing south-east 60 miles, uniting on the border between Barnwell and Orangeburgh, continue the original course thirty miles into Colleton: thence turning to nearly due south 25 miles, the stream divides into two unequal outlets. One under the name of south Edisto maintains a southern course of twelve miles into St. Helena sound. The other, flowing south-east fifteen miles, enters the Atlantic ocean by the name of north Edisto.

The three outlets of St. Helena sound, and the two Edisto's, are so blended, as to be properly considered only the estuary of one basin. The mouth of south Edisto river into St. Helena sound is at N. lat. $32^{\circ} 28'$, long. W. C. $3^{\circ} 21' W$.

Between the two outlets of Edisto is inclosed the fine island of Edisto, which advancing north-east is succeeded by a congeries of other islands, the principal of which are Wadmelaw, John's, and James' islands, composing Colleton and Drew's parishes in Charleston district. Wadmelaw, with the two minor islands of Seabrooke and Kiawaw, are separated from the continent by north Edisto and Stono rivers. The former, for about ten miles after separating from south Edisto, is known locally as Dawho river, and which again dividing, is continued into the ocean as north Edisto by the right branch, whilst that of the left, assuming the name of Stono river, in a course of 35 miles encircles Colleton parish, and finally enters the Atlantic ocean in Stono inlet. In its perimeter from north Edisto, Stono river flows first north-east 15 miles, where it receives Wallace's branch, and turns to a little south of east, 5 miles, under the name of Wappoo cut. At the eastern termination of the Wappoo cut, Stono river divides; the main volume turning south flows, as I have *shewn*, into Stono inlet; but the other branch, by

the name of Wappoo creek, east into Ashley river opposite Charleston.

A small basin of about thirty miles square, or 900 square miles, opens into the Atlantic ocean by the most eligible harbour along the south-western coast of the Atlantic ocean in the United States. Not from superior depth of water, in which it is exceeded by St. Mary's river, and equalled by that of Savannah, but in its position and spacious sheltered harbour, and from an early settled and well cultivated interior, Charleston has risen into the largest city on the Atlantic coast of the United States, south from Chesapeake bay.

The city of Charleston is situated on the point formed by Ashley and Cooper rivers, though the far greater part of the commercial business is done on the latter. The city is about six miles within the bar, and a small fraction above four west from Fort Moultrie, on Sullivan's island, and two and a quarter north-west from Fort Johnson, on James' island. The channel admits vessels of 16 feet draught. The city is at N. lat. $32^{\circ} 43'$, long. W. C. $2^{\circ} 54' W$.

The basin of Charleston has been artificially united to that of the Santee by a canal of 22 miles, from the head of Cooper river into Santee, 50 miles, a little west of north, from the city of Charleston.

An extent of coast of 55 miles, still broken by inlets and islands, reaches from Charleston harbour, to south Santee entrance, which three miles farther is succeeded by the north entrance of the same stream, and again at eight miles from the latter, by the wider opening of Winyaw river, or Georgetown entrance. Winyaw river or bay is itself merely the estuary of Black river, Great Pedee, and Waccamaw rivers.

There is so small an interval of coast between the two outlets of Pedee and Santee, that without much violence to physical correctness they might be united into one basin; but the two rivers differ so ver

widely in their structure, that a separate notice is indispensable. The Santee is formed by two great confluent, the Congaree, and Wateree. Having their remote sources in the south-eastern vallies of the Blue Ridge, the Saluda rises in Picken's and Greenville districts, South Carolina; the Ennoree, in Greenville and Spartanburg districts; and Broad river in Rutherford county, North Carolina, all interlocking sources with the French Broad branch of Tennessee, between N. lat. 35° and $35^{\circ} 35'$, long. 5° W. from W. C. Converging to a common point of influx, and by a general course of south-east, the united waters of those minor rivers meet at Columbia, and by a singular concurrence, on the verge of the primitive ledge over which the volume passes, and is hence known as the Congaree. The site of Columbia and head of Congaree, is again rendered remarkable by being almost exactly upon the intersection of N. lat. 34° , and of long. W. C. 4° W. Continuing a south-east course forty miles below Columbia, the Congaree receives the Wateree from the north.

Though inferior to its rival in mass of water, the Wateree considerably exceeds the Congaree in length of course. By the name of Catawba, the remote sources of the Wateree drain Burke county in North Carolina, and in part rise as high as N. lat 36° , long. W. C. 5° W. Interlocking with the head waters of French Broad, Nolachucky, Great Kenhawa, and Yadkin, and winding N. E. by E. sixty miles along those of Broad river, the Catawba leaves Burke, and forming the boundary between Iredell and Lincoln counties, gradually assumes a course of S. S. E. 150 miles, entering South Carolina between Lancaster and York districts, and above N. lat. 35° ; and joins the Congaree at N. lat. $33^{\circ} 45'$, forming the Santee.

The Santee with its branches, though navigable for boats far above the primitive ledge, is deficient

as an opening to the ocean, though steam boats ascend to Columbia.

With the basin of the Pedee, terminates that character of coast which we have found prevailing from Florida point. In this range we have seen rivers of greater or less magnitude dividing into numerous branches before entering the Atlantic ocean. The coast, rising by a very slow acclivity, is cut, by innumerable channels, into islands, the surface of which are but little elevated above high tides. The rivers, comparatively, in a peculiar degree shallow, and in every instance deeper within than on their bars. The line of coast, though generally uniform as to course from point to point, is very irregularly indented. Along this part of the Atlantic slope, through 600 miles, the inlets are, as we have seen, shallow and impeded, but are excessively numerous, particularly from St. John's river to Santee and Pedee, inclusive.

With the Pedee, however, a new order of coast commences, and which, if Long Island is included, continues to Montaug point, along 800 miles. In the latter instance, the range from point to point stretches in regular lines or curves, with long sand isles lying parallel to the main shore. The rivers opening towards the ocean in very wide sounds or bays.

Winyaw bay, or Georgetown entrance, opens to the ocean at N. lat. $33^{\circ} 11'$, long. W. C. $2^{\circ} 11' W.$ The main confluent of this basin, the Pedee, designated near its source by the name of Yadkin, has its extreme fountains in the Blue Ridge, N. lat. 36° , long. W. C. $4^{\circ} 40' W.$, interlocking sources with Catawba, Holston, and Great Kenhawa rivers; and flowing thence N. E. by E. 80 miles over Wilkes and Surry counties of North Carolina, turns abruptly to S. S. E. 100 miles; enters South Carolina between Marlborough and Chesterfield districts, and continuing the latter direction 80 miles, is augmented from the west by a considerable tributary, Lynche's

river, and 20 miles lower receives a more important branch from the north, Little Pedee. Below the junction of the two Pedees, the united stream turns to S. S. W. 30 miles to the port of Georgetown. At the latter place, the name of Pedee is changed to that of Winyaw bay, into the head of which is discharged, besides the Pedee, Black river from the west, and Waccamaw from the north-east.

The latter confluent of Winyaw bay, though humble in respect to either volume or length, is remarkable from its peculiar position and course. Rising in Bladen county, North Carolina, N. lat. $34^{\circ} 40'$, flows south 50 miles, enters South Carolina, in Horry district. The Waccamaw, where it passes the line between the two Carolinas, approaches within eight miles of the Atlantic ocean, but instead, however, of continuing its course into the ocean, it turns to S. W. parallel to the opposing coast, from which it flows at a distance varying from 3 to 8 miles by comparative courses 60 miles, and finally enters Winyaw bay opposite Georgetown.

In the future improvements of inland navigation along the Atlantic coast, a most important link may no doubt be afforded by the peculiar course of this small but remarkable river.

From Winyaw point to Cape Fear, by the name of Long Bay, the Atlantic coast curves inward, presenting a section of an elongated ellipse, and in a distance of one hundred miles, winds with a regularity which mocks a work of art, and without a single inlet worthy of notice. N. lat. 34° and long. 1° W. from W. C. intersect in the mouth of Cape Fear river. The most considerable stream flowing entirely within North Carolina, Cape Fear river, rises in Guilford and Rockingham counties, N. lat. $36^{\circ} 20'$, long. W. C. 3° W., and flowing by a general course S. E. 200 miles, receiving a number of *confluents of moderate size*, enters the Atlantic about *10 miles north from Cape Fear*.

The basin of Cape Fear, though not very extensive, is of consequence as a commercial inlet. Two of the most important seaports of North Carolina are in this basin; Wilmington, on N. E. Cape Fear river, and Fayetteville, on the main stream, are wealthy and prosperous emporia; the former 30, and the latter 120 miles within Cape Fear.

By another elliptical curve, with an astonishing resemblance, both in extent and form, to that from Winyaw to Cape Fear, the Atlantic coast again sweeps from the latter to Cape Lookout, under the name of Onslow bay. New River inlet, from Onslow county, North Carolina, is the only entrance of note which breaks the monotony of the coast in 120 miles. A series of long, narrow, and low sandy islands, as regular as the opposing coast, follow each other, leaving a very confined sound within.

Cape Lookout, with a strong resemblance to Cape Fear, is only a salient point of a long coast island, and projects into the Atlantic ocean at N. lat. $34^{\circ} 34'$, long. W. C. $0^{\circ} 22'$. Leaving Core and Pamptico sounds within, and again forming another elliptical curve inwards, the Atlantic coast stretches 80 miles from Cape Lookout to Cape Hatteras. Extending from N. E. by E., and S. W. by W. 70 miles, with a mean width of 15, Pamptico sound spreads west from Cape Hatteras islands, and terminates inland by the wide bays of Neuse and Pamptico rivers.

Neuse river rises in Person and Orange counties, North Carolina, interlocking sources with the confluents of Cape Fear, Roanoke, and Pamptico. The higher part of its course is S. E. 80 miles into Johnson county, where it turns to S. E. by E. again, 80 miles, to Newbern, below which it gradually spreads into a semi-circular bay of forty by from three to five miles, which in its turn opens into the wider expanse of Pamptico sound.

Interlocking with the lower and more humble branches of Roanoke, the Pamptico drains the space

between that river and the Neuse. Rising in Gravelle and Warren counties, by several branches, the general course of the Pamptico is S. E. by E., 1 mile to Washington, where it dilates into a bay which thirty miles still lower terminates in Pamptico sound.

Pamptico sound is connected on the south-west with Core sound with Onslow bay; and on the north-east with Albemarle sound, and opens into Raleigh's bay by Ocracoke inlet. The latter may indeed be considered as the mouth of the sound, and has 14 feet of water at mean tide. Ocracoke inlet is about 3 miles north-west from the point in the ocean where latitude 35° and longitude $W. C. 1^{\circ} E.$ intersect, and is distant about 30 miles from the mouths of Neuse and Pamptico bays.

We have now reached the north-east termination of the great southwest bay of the Atlantic slope. It has been already observed, that Cape Hatteras forms at once a physical limit of climate and geographical lines of coast. Projecting a salient angle into the Atlantic ocean, this storm and ocean-beaten promontory receives the full force of the Gulf stream from the Bahama channel. The numerous long sandy islands, for 30 miles on each side Hatteras, present an unbroken front to the never tiring surge; the Pamptico sound within, offering in its tranquil surface a curious contrast to the eternal billowy contest without. It is here, ever since the discovery of America, that the genius of the tempest seems to have chosen his abode.

With Cape Hatteras the Atlantic coast turns on a small inclination west of north, which course it sustained 130 miles to Cape Henry or entrance into Chesapeake bay. In this latter expanse, the ocean border continues to present its regular series of islands and narrow inlets. In the rear of this chain the interior is penetrated by the deep indenting Albemarle sound. Lying nearly parallel to the

other, but by the different tending of the respective coasts, Pamptico sound sweeps along the course of the opposing Raleigh's bay, whilst Albemarle stretches directly into the continent 60 miles, and receives into its head Roanake and Chowan rivers.

The basin of the Roanoke and Chowan unites the rivers of Virginia and North Carolina. The Roanoke, formed by two branches, the Dan and Stanton rivers, is the first stream from Cape Florida which derives any part of its waters from beyond the Blue Ridge. Dan river rises in Surry and Stokes counties, North Carolina, and in Patrick, Henry, and Franklin counties, Virginia, and pursuing a general course nearly east 120 miles, receives the Stanton from the northwest. The latter, rising in Bottetourt and Montgomery counties, Virginia, in the Great valley west from the Blue Ridge, interlocking sources with James' river and Great Kenhawa, turn east, and piercing the mountain chain inflect to the S. E. and S. E. by E., and after a comparative course of 120 miles joins the Dan and forms the Roanoke.

The sources of the Roanoke spread from N. lat. $36^{\circ} 10'$, to N. lat. $37^{\circ} 25'$, and flowing from the most elevated table land in the United States, give to the basin an immense comparative range of climate. The most north-western branches rise in the spurs of the Peaks of Otter, in the Blue Ridge and Tinker mountains, at an elevation of at least 1500 feet.* This difference of level produces a change of temperature equal to four degrees of latitude, though the mean range of the basin declines but little from an east and west direction. All the higher branches of the Roanoke are upon the primitive; and similar to the Alatomaha and Santee, the Roanoke receives no large tributaries below the point of union of its main constituent branches, at N. lat. $36^{\circ} 40'$ and

* See tables 2 and 3.

long. $1^{\circ} 40'$ W. from W. C. Here the main stream inclining to S. E. by E. about 40 miles, quits Virginia in the S. W. angle of Brunswick county, and entering North Carolina in the N. E. angle of Warren county, quits the primitive and enters on the region of alluvion, at the rapids between Halifax and Northampton counties. Thus far the ocean tides penetrate the basin. Below tide water the particular courses of the Roanoke are excessively circuitous, and in a comparative distance of sixty miles it is probable the actual channel amounts to near 100. The entire comparative course below the junction of Dan and Stanton is about 140 miles, and the whole length by either branch 250 miles. If to this we add 60 for Albemarle sound, the Roanoke has a course of 310 miles.

The Chowan, formed by the Meherin and Nottaway rivers, is, when compared with its rival the Roanoke, an humble stream, but the former derives great importance from the position and range of its valley. The Meherin branch rises in Charlotte county, Virginia, at long. $1^{\circ} 30'$ W. from W. C., N. lat. 37° ; and flowing thence S. E. by E. 80 miles, enters North Carolina between Gates and Northampton counties, and continuing its course 20 miles, joins the Nottaway between Gates and Hertford counties above Wynnnton.

The remote north-western sources of the Nottaway are in Prince Edward county, a little northward from those of the Meherin. Inclining but little from an eastern course, the Nottaway flows about 70 miles into the centre of Sussex; bending thence to S. E. 40 miles, receives from the north, on the line between Virginia and North Carolina, the Blackwater. The latter rising in Prince George's county, in the vicinity of Petersburg, flows 40 miles to the S. E., and turning thence 25 miles, inclining *something W. of S.*, unites with the Nottaway as *already stated*. Below their junction the course of

the Blackwater is preserved, and 10 miles within North Carolina the combined waters mix with those of the Meherin, and form the Chowan, almost exactly on the meridian of Washington.

A fine tide water volume, the Chowan, pursues a course of south-east 20 miles, whence it opens into a wide bay, and bending to nearly south 20 miles, terminates in Albemarle sound.

As a commercial basin the Roanoke by neither branch offers facilities in comparison to volume of water or surface drained. Sloops ascend both branches about 70 miles, above which boats are used. As in most other streams of the Atlantic slope, which flow from the Appalachian chain, the most unnavigable part of the Roanoke is immediately above the primitive ledge. The rapid and gigantic strides of internal improvement will, however, soon remove obstacles to the passage of vessels on our streams, which a few years past, and even now, appear irremovable.

In respect to climate, the Roanoke basin demands great attention in a view of the United States. Extending from east to west, between N. lat. $35^{\circ} 30'$ and $37^{\circ} 30'$, it constitutes the mean between the extremes of the United States, lat. 25° and 52° , since, though restricted by mere lines of latitude to $37\frac{1}{2}^{\circ}$, that part of the basin lying upon the Appalachian table land, virtually carries the temperature to N. lat. 41° .

Rising like an immense central base, that section of the United States comprised in the western part of North Carolina, eastern part of Tennessee, and south-western part of Virginia, discharges the various river sources like radii from a common centre. A single glance on a general map of the United States will suffice to shew the full force of this observation.

CHAPTER IV.

GEOGRAPHICAL VIEW OF THE MIDDLE SECTION
OF THE ATLANTIC SLOPE.

WE have now passed the tropical zone of the Atlantic slope, and have left the region of the sugar cane, orange, fig, and even in great part cotton, and have reached the climate of wheat, the apple, and luxuriant meadow grasses.

The first basin of this temperate tract is that of Chesapeake. By the caprice and accident of geographical nomenclature, the Susquehanna loses its name at the head of its tides, or at the point where it passes from the primitive to the sea alluvion. The Chesapeake must therefore give name to this the most extensive of the Atlantic basins of the United States; and under this general head, we have before us a navigable expanse, in form of an immense triangle, the base of which, from the mouth of Chesapeake bay to the sources of Susquehanna river, amounts to 400 miles; side along the valley of James' river 250 miles; area, including every inflection, at least 65,000 square miles. Extending from N. lat. $36^{\circ} 40'$ to N. lat. $42^{\circ} 55'$, and from $1^{\circ} 45'$ E. to $3^{\circ} 30'$ W. long. W. C.

I have already expressed an opinion that in strictness of geographical language, Chesapeake bay differed from the other sounds upon the Atlantic slope, only as having one outlet, in place of two or more. It differs, however, in another greatly more important circumstance, that is in depth of water. We have seen the shallowness of the rivers and sounds to the south-west of Chesapeake. This feature is at once reversed in this great recipient, which, al-

most to the head of its tides, sinks to a depth below the largest draught of vessels.

The Chesapeake stretches in a direction nearly due north, from lat. 37° N. to $39^{\circ} 33'$ N. or nearly 180 miles. The breadth is very irregular. Below the Potomac, or for about 70 miles, the width averages 25 miles; but from the influx of the Potomac to that of the Susquehanna the mean width does not exceed 10 miles. These elements would yield an area below the Potomac of 1750, and above the mouth of that river 1100; in all, 2850 square miles. If to this we add 750 square miles for the minor bays or channels below tide water of James river, York, Rappahannock, Potomac, and others of a similar nature but of less magnitude, we shall have an aggregate superficies of 3600 square miles for Chesapeake bay and its immense branches.

In the review of this important section of the Atlantic slope we shall advance by its constituent vallies, of which that of James river follows that of the Roanoke. Entering Chesapeake from the Atlantic ocean about 20 miles, an opening appears on the left, which is found to be the capacious mouth of James' river. This great confluent derives its remote sources from the central vallies of the Appalachian system. If a line was drawn from the extreme western fountains of the Roanoke, and extended also along those of James river, it would intersect that part of the mountain system at an angle of forty-five degrees nearly; and here we perceive at once the peculiar inflections of the river vallies of the basins of Susquehanna and Delaware. In the higher branches of James river those inflections either pursue the course of the mountain vallies, or cross them and the mountain chains at right angles. This structure prevails from the sources of Roanoke to those of the Delaware, with a regularity which evinces a general cause.

Thus influenced in their courses, the two north-

western branches of James river, rising in Pendleton and Bath counties, Virginia, flow down the mountain valleys S. S. W., meet other streams flowing in a directly opposite course, gradually unite, turn to N. E. by E., enter into and receive the waters of Rock-bridge county at the northwest base of the Blue Ridge. Turning again at right angles, and piercing the opposing mountain chain, leaves the great elevated table land of central Virginia.

Interlocking sources with the Kenhawa, the Monongahela, and Potomac, this mountain section of James river is, by actual survey, elevated at a mean of about 1500 feet above the Atlantic level; between $37^{\circ} 20'$ and $38^{\circ} 20'$ N. with a barometrical height equivalent to four degrees, the climate is virtually that of N. lat. 42° on the Atlantic ocean.

Below Blue Ridge, James river flows S. E. 20 miles, to Lynchburgh; turns thence N. E. 40, and again abruptly inflects to S. E. by E. With many partial bends, the latter general course is maintained 140, to its influx into Chesapeake bay, between Willoughbay Point and Old Point Comfort, at N. lat. 37° , lon. W. C. $0^{\circ} 45'$ E.

The Appomattox, entering from the right, $23'$ W. from the meridian of Washington, is the only large tributary stream which contributes to augment James river on that side below the Blue Ridge. The Appomattox rises in Prince Edward and Buckingham counties, flows by a general course nearly east, falls over the primitive ledge at Petersburg, and joins the main stream 35 miles below Richmond.

Rivanna from Albemarle and Fluvanna counties, and Chickahomina entering almost on the meridian of Washington, are the only streams worthy notice which flow into James river from the left.

Following the general line of each particular course, this fine river has a comparative channel of 270 miles below the Blue Ridge, and 50 miles in the

Great Valley below the influx of Cow Pasture river; having an entire navigable channel of 320 miles, something above one hundred below, and the residue above tide water. The tide reaches to Richmond in James river, and to Petersburg in the Appomattox. Ships of the line can enter Hampton Roads, and those carrying 40 guns can be navigated to Jamestown, 25 miles higher. Merchant ships of 250 tons ascend to Warwick, and those of 130, to Rocketts, or the port of Richmond. The canal round the falls at Richmond unites ship to boat navigation, the latter extending upwards of two hundred miles. Petersburg is little if any less accessible than Richmond to sea vessels.

Since the very dawn of internal improvement in the United States, and particularly since the rapid augmentation of population in the Ohio valley, the channel of James river has attracted public attention, as offering a route in connexion with the Great Kenhawa to reach the Ohio river. One of the most obvious benefits of such a view as this, is to trace and place before the reader clear views of the irregularities in the face of the United States, and to enable the statesman and statist to adequately compare proposed routes of canal or road improvement.

Independent of elevation, the higher branches of James river, and those of Great Kenhawa, below the bend of the latter in Montgomery county, Virginia, are so relatively placed as to greatly facilitate canal operations. The tables will shew, however, the respective heights which are to be overcome by lock architecture, from which inductions may be drawn, and fair comparisons made between canal and road improvement.

Whoever examines the courses of James river on a good map, and compares them with the geological observations I have made on their peculiar *compliance* with the mountain chains, will find that *the general range* of the channel is interrupted by

this mountain influence as low as the mouth of the James river, and even to the falls and head of tide water at Richmond. An humble, but a very distinct, and continuous chain of mountains runs on the rivers a very influential chain of mountains traverses North Carolina, Virginia, Pennsylvania, and New-Jersey. This chain rises in Rutherford county, North Carolina, extends through Burleigh county, thence separates Wilkes from Iredell, and reaches in broken links through Surry and Stokes; enters Virginia in Henry, about lon. 3° W. from W. In North Carolina this chain takes several local names. In Rutherford, Flint hill is its first distinctive mass; it is known as Montague hills in Burke; the Iron mountain between Wilkes and Iredell; and as the Pilot mountain in Surry; and as Sawra mountain in Stokes. It again, as Turkey Creek mountain, separates Henry from Franklin county, Virginia; appears in Buckingham and Nelson counties, and assumes distinctness as a chain known as South-west mountain, in Albemarle. Thence it may be traced into Maryland, over Orange, Catoctin, Fauquier, and past Leesburg, in Loudoun, crossing the Potomac below the Monocacy. Rising into a noted peak, the Sugar Loaf, in the west angle of Montgomery county, Maryland, thence separates Montgomery from Frederick, and Frederick from Baltimore, merging into Pennsylvania in York county, nearly on the meridian of Washington. Traversing the south-eastern parts of York and Lancaster counties, separates Chester and Montgomery from Berks, and Lehigh and Northampton from Bucks, crosses Delaware river below Musconetcong river, ranges over Hunterdon, Morris, and Bergen counties, New Jersey, and is known as the Haverstraw mountains in New-York.

In all this distance of six hundred miles, any person well acquainted with the physical geography of the United States, would detect a chain of mountains from a correct map of the intermediate riv-

The mountain agency is completely apparent in the higher branches of the Santee, Pedee, and Roanoke; in the courses of James river above and below Lynchburg, and in the sources of Rivanna, Rapid Ann, and Rappahannoc rivers. It is again very visible in the courses of Potomac above and below the Monocacy. Similar effects are easily traced in the Susquehanna, Schuylkill, Delaware, Raritan, and Passaic rivers.

The remote sources are drawn from the verge of the western floetz formation, from which they are only separated by the Allegheny or main chain of the Appalachian system. Proceeding thence over the central secondary, and primitive, reach and pass over the sea sand alluvion.

The minor valley of York river follows that of James river. The Pamunkey and North Anna, both rise in the south-west mountain, $1^{\circ} 20'$ W. from W. C., N. lat. $38^{\circ} 10'$, in Orange, Albemarle, and Louisa counties, and after a course of sixty miles each, they unite between Hanover and Caroline to form the Pamunkey river. The latter, after a very tortuous course of perhaps seventy, but comparatively only forty miles, receives a smaller stream, the Mattaponi, from the north-west. At their junction, the united stream opens into a bay or river; thence in a distance of forty miles known as York river, to its influx into Chesapeake bay.

The remarkable valley of the Rappahannoc intervenes between that of York and Potomac. The Rappahannoc rises in the Blue Ridge, and in the northern part of Culpepper and western part Fauquier counties, one degree west from Washington, and at lat. $38^{\circ} 52'$ N. Assuming a course miles to the south-east, receives from the west much more considerable stream, the Rapid A. The latter rises also in the Blue Ridge, and in counties of Madison and Orange. The united *lume retains* the name of Rappahannoc, and t

miles below their junction falls over the primitive ledge, and meets the tides between Fredericksburg and Falmouth. The Rappahannoc, below its main fork above Fredericksburg, in a course of S. E. by E. 130 miles, does not receive even a large rivulet. Below the falls, similar to other rivers of the Chesapeake basin, this river imperceptibly widens into a bay, up which vessels of 140 tons can ascend to Fredericksburg.

The progress of our survey now brings us into the very important valley of the Potomac. If we turn our eye to a map of Virginia, Maryland, and Pennsylvania, we find, interlocking sources with James river, Great Kenhawa, Monongahela, and Susquehannah, a series of rivers, north-west from the Blue Ridge, and flowing along the mountain valleys; those of Virginia and Maryland having their courses to the north-east, and those of Pennsylvania to the south-west, whilst a middle stream is perceived rising west of all the chains but two of the Appalachian system, and forcing its devious way across the system towards the Atlantic ocean. This series of rivers unite to form the Potomac, the extreme western sources of which rise $2^{\circ} 45' W.$ from W. C. The south and main branch of Potomac rises in and drains Pendleton county, in Virginia, heading with, but flowing in a directly opposite course to Greenbrier branch of Great Kenhawa, and Jackson's and Cow Pasture branches of James river. The south branch rises as far south as N. lat. $38^{\circ} 25'$, completely overhauling the sources of the Monongahela. Flowing N. E. about 100 miles, between the Allegheny and Kittatinny chains, meets from the west an inferior stream, but to which the general name of Potomac is applied.

The Potomac rises in a ridge locally called the Backbone mountain, at N. lat. $39^{\circ} 12'$, and flowing thence N. E. 30 miles, receives a small but important branch, Savage river, from the N. E.; then

turns at right angles to the S. E., and piercing two chains of mountains in about 10 miles, inflects again to the N. E. 20 miles to Cumberland. Here once more the Potomac is inflected to the south-east, by the opposing mountain masses, across which its volume is precipitated, and 20 miles below Cumberland meets the south branch, and a short distance below once more turns to north-east to Hancock's town. At this point the Potomac has reached its most northern bend, N. lat. $39^{\circ} 40'$, and within little more than two miles from the southern boundary of Pennsylvania. Turning to south-east below Hancock's town, it passes the Kittatinny chain, and with many partial windings, but a general course of 40 miles, receives the Shenandoah from the south-west, and breaks through the Blue Ridge at Harper's Ferry.

The Shenandoah is the southernmost branch of Potomac, rising in the south-west angle of Augusta county, at N. lat. $38^{\circ} 55'$. Draining the whole of Augusta, Rockingham, and Shenandoah, and part of Frederick and Jefferson counties, the Shenandoah is truly a river of the great Appalachian valley between the two chains of Blue Ridge and Kittatinny. The main stream follows the range of the former chain, at a distance of from two to five miles, receiving its tributary branches from the west or left.

The Shenandoah valley is 130 miles in length, with a mean width of 20; area, 2600 square miles, with a considerable difference of elevation. By reference to table 4th, page 70, it will be seen that the surface of the water at Harper's Ferry is 182 feet above tide water at Georgetown, whilst by comparison with the first element in tables 2 and 3, it will be evident that the sources of Shenandoah must exceed one thousand feet.

That spot where the Potomac and Shenandoah intermingle, has gained a celebrity which must endure as long as sublime scenery and the name of

Thomas Jefferson continue to excite admiration. Harper's Ferry is at N. lat. $39^{\circ} 18'$, lon. W. C. $0^{\circ} 38'$ W. That part of the valley of Potomac above the Blue Ridge extends in latitude from 38° to the sources of the Conococheague, 40° , or through two degrees of latitude, in the direction nearly of S. W. and N. E. It lies in form of a nearly regular parallelogram, 150 by 50; area, 7500 square miles.

Leaving the attractive mountain pass at Harper's Ferry, the general course to south-east is continued to the mouth of Monocacy 10 or 12 miles, where it passes the last distinct chain of mountains, and inflecting a few miles to the south, resumes a south-east course, which is maintained to the head of tide water at Georgetown, fifty miles below the mountain pass at Harper's Ferry. Below tide water the Potomac imperceptibly loses the features of a river in that of a bay, winds between Georgetown and the Navy Yard at Washington to a southern course, and below Alexandria inclines to the west of south 40 miles; sweeps round to N. E. 15 miles, and finally regaining a S. E. direction about 50 miles, opens into Chesapeake bay, at N. lat. 38° , having returned to the latitude of its most southern source, the Shenandoah.

In its natural state the Potomac is the most navigable branch of Chesapeake; ships of any burthen of war or of commerce, can be navigated to Alexandria, and vessels of very heavy burthen to Washington navy-yard. This is the most distant point from the ocean that ships of the line can be navigated in the United States. It is upwards of one hundred miles from the Atlantic ocean, at the mouth of the Delaware, the nearest point of that ocean; and from the entrance of the Chesapeake, near two hundred miles.

The attention of the philosopher and statesman *will be secured* to the central position of the Potomac valley; its reaching almost over the Appala-

chian system of mountains, and with these natural, the political advantage of containing the capital of the nation. It is the business of the author of this view to collect and record data, and leave their application to those more directly concerned. The general elevations and the connexion of the Potomac valley with that of Ohio, are given in table 4., page 70; and it may be observed here, that seven or eight feet are about the mean term of canal locks already made in either Europe or America; and that the canal uniting the head waters of the Volga with Lake Ladoga, by the small rivers Emsta and Twere, elevation 568 feet, is the highest canal navigation yet actually executed; and there "*The rivers Emsta and Twere, near the summit level, have not sufficient water for a constant supply; and it is necessary to pound up the waters and lakes, for a flash, or artificial flood. This is accomplished by pen sluices, and some short cuts.*"

The next stream entering the western shore of Chesapeake bay after the Potomac, is the Patuxent. Obeying in a very striking manner the great inflections of the Potomac, the Patuxent rises in the south-east mountain, on the south-east border of Frederick, and near the connecting angle of Montgomery, Baltimore, and Frederick counties, at N. lat. $39^{\circ} 20'$, long. W. C. $0^{\circ} 08' W$. Thence flowing south-east 35 miles, reaches to within five from the tide water of Chesapeake bay; inflecting thence nearly south 30 miles, at a distance of from eight to ten miles from the Chesapeake. it again gradually bends to south-east 25 miles, opens into a bay from two to three miles wide, until merged in the general recipient, between Calvert and St. Mary's counties.

Next above the Patuxent, spreads a small valley to which Baltimore has given incalculable importance. The Patapsco rises in the south-east mountain along the borders of Baltimore and Frederick counties, and flowing S. E. by E. 30 miles, unite and

fall over the primitive ledge, opening into the Chesapeake by a bay of ten or twelve miles in length. At the head of Patapsco bay, on a small haven at the mouth of Falls creek on the primitive ledge, stands the city of Baltimore, N. lat. $39^{\circ} 18'$, long. $0^{\circ} 27' E.$ from Washington City. Vessels of 600 tons are navigated to Fell's Point, the lower harbour of Baltimore.

The small valleys of Patapsco, Gunpowder, and Bush river, fill the space between the upper Patuxent, and the creeks of the lower Susquehanna.

The eastern or left shore of Chesapeake bay, for about 50 miles, composing the Virginia point, is but little broken by bays; but with lat. $38^{\circ} 03'$, nearly on the Maryland line, opens Pocomoke bay and river, leading to Snow Hill, in Worcester county; thence, turning Watkin's point, the small bay of Manokin leads to Princess Ann, and the Wicomico to White Haven. Nanticoke river rises in Sussex county, of Delaware, and flowing south-west, enters Maryland, separating Somerset and Dorchester counties, forming with Wicomico, Fishing bay. With an intervening peninsula, forming Dorchester county, we next enter the bay and river Choptank. This is the most considerable stream of the eastern shore of Maryland, rises in Kent and Sussex counties, Delaware, and flowing S. W., enters Maryland, and after a course of 50 miles turns to N. W. and dilates into a bay of about 15 miles, on one of the arms of which, Tread Haven, stands Easton, in Talbot county, the most important mart of eastern Maryland. Next follows the small bay of St. Michael's; and on N. lat. 39° , the mouth of Chester bay, formed by a small river rising in Delaware, and flowing thence south-west, 35 miles, between Kent and Queen Ann counties, opens by a wide bay into Chesapeake; Sassafras, separating Kent and Cecil, and finally, Elk river flowing out of Pennsylvania and Delaware, into Cecil county, Maryland.

This eastern slope of the Chesapeake basin reaches from Cape Charles, N. lat. $37^{\circ} 15'$, to the sources of Elk river, N. lat. $39^{\circ} 50'$, in a direction very nearly north and south, 180 miles. The entire peninsula between the Chesapeake and Delaware bays demands peculiar attention from its position, and on account of the very great political, moral, and commercial effects of insulating it by a canal. If we consider the peninsula as limited on the north by the small valleys of Elk and Christiana, it will form an irregular oval, or rather ellipse, whose longest axis, 165 miles, will cut it into nearly equal sections, by a line coinciding with the western boundary of Delaware. The widest part from Cape Henlopen to the western angle of Talbot county, is within a small fraction of seventy miles. That part, however, which is occupied by Northampton and Accomack counties, Virginia, between Cape Charles and lat. $39^{\circ} 03'$, is fifty miles in length, but with a mean width not exceeding ten miles. This with the deep and numerous indentings of the Eastern shore of the Maryland part of Chesapeake bay, will restrict the area to about 5000 square miles. The preceding area, when naturally divided by the waters flowing into Chesapeake, into the Atlantic ocean, or Delaware bay, will fall into two very unequal sections. The larger streams of the peninsula have the Chesapeake as their recipient, leaving to the opposite streams an extended strip of not above from one to twelve miles in breadth.

The peninsula from Elkton to the Delaware, at the great bend below Newcastle, is about ten miles wide, but the tide level in Elk and Christiana approach so much nearer to actual contact, as almost to naturally insulate the whole point. A canal is now in progress to effect this important improvement, through Elk river bay, to the mouth of Back creek, one of its branches; thence up the latter, and over the summit level into St. George's creek, and

thence into Delaware river, 45 miles below Philadelphia.

The prodigious revolution which such a canal must produce when completed, may be anticipated by a glance on a general map of the United States, and aided only by a superficial knowledge of the commercial relations of the adjacent cities: but it is not alone in peace; it is still more in a state of war, when the advantage of this artificial river will be felt and acknowledged by each of the contending parties. In the United States its completion ought to be a day of triumph indeed.

We have now reached the highest and most extensive, and in some essential respects the most important valley of the Chesapeake basin, that of Susquehanna. From its extent, and from the western origin of its sources, the Susquehanna seems to form a natural chain of water communication between the Atlantic slope and basins of the Mississippi and St. Lawrence. This river valley penetrates more deeply into the central floetz formation than the Potomac. All its secondary confluent of any considerable length of course, enter from the right, and having their sources on the central floetz, the aggregate stream, as I have already premised, crosses the entire Appalachian system.

If we turn our attention to the general structure of the Susquehanna valley, we find its extreme northern sources in Madison, Oneida, Herkimer, and Otsego counties, New York, as high as N. lat. $42^{\circ} 55'$, and in lon. from 1° to $2\frac{1}{2}^{\circ}$ E. from Washington; within 16 miles from Oneida lake, and 15 from the Erie canal, and in the angle between the sources of the Oneida and Mohawk rivers. That branch which rises farthest north is the Chenango, which, after being augmented by many minor streams, flows by a general course south 60 miles, and joins the *Susquehanna proper*, a much larger river, from the north-east.

The Susquehanna originates in the northern spine of the Catsbergs, and with its western branch, the Unadilla, drains the space between the Coquago branch of Delaware and the Chenango, and its most remote northern source reaches to within ten miles from the Mohawk river and Erie canal near Herkimer. The north-eastern branch of the Susquehanna is designated correctly the east branch. It is in fact the most eastern water of the Chesapeake basin, and what is very well worthy notice, the most north-eastern fountains rise within about 40 miles from the level of tide water in Hudson river, immediately below Albany. The eastern branch, after a general course of 50 miles south-west, receives the Unadilla at the south-west angle of Otsego county; thence inclining more to the south, enters into and rapidly curves out of Pennsylvania, again enters New-York, turns to west, and receives the Chenango at Binghamton. Continuing a western course 20 miles, passes Oswego, and winding to south-west and south, re-enters Pennsylvania, and joins the Chemung or Tioga from the north-west, after an entire comparative course of 140 miles.

The Chemung is composed of two branches; the Chemung rising in Allegheny and Steuben counties, New York, and the Tioga or Connewisque, in Tioga county, Pennsylvania. Joining in Steuben, the united waters turn to south-east, enter Pennsylvania, and form a junction with the Susquehanna at Athens or Tioga point, after a comparative course of 80 miles.

What renders the northern part of the Susquehanna valley in a particular manner worthy attention is, that the two great confluent, the Chemung and Susquehanna, circle round the two long and navigable lakes of New York, the Seneca and Cayuga. The latter stretching in an almost direct line from the Erie canal to within 20 miles from Newto

on Chemung or Tioga river.* At Newtown, the adjacent country, though very hilly, or, more correctly, mountainous, is of peculiar structure. The intermediate space from the head of Seneca lake to Newtown, is a high valley, as may be seen from the table referred to in the margin.

Nature in this section of country appears to have advanced half-way, to aid the efforts of man in forming channels of inter-communication between the basins of the Susquehanna and St. Lawrence. The two fine lakes of Seneca and Cayuga are each upwards of 35 miles in length, and occupying the angle between the two main northern confluent of the Susquehanna, appear to have been placed in their actual position, as if to give in their utmost extent the greatest assistance to the formation of canal lines.

In the structure of the Susquehanna valley, we have before us some truly interesting phenomena. If we examine the rock formations, we find them in a great degree, though not altogether, conformable to the range of the mountain chains, but the rivers flow evidently independent of either. It has been already noticed, that the Susquehanna pierces all the rock formations from the central secondary to the Atlantic alluvion. This river is seen pouring down from an elevation above the base of the mountain, against which its various branches rush, and have in the lapse of time torn passages through the rock barriers, and gradually uniting, at length reach the level of the tides, and tranquilly mingle with the waves of the Atlantic ocean. This contest between the apparently stable mountains and the fleeting rivers, which began, it is most probable, with the creation, is far from having terminated. The various rivers of the Chesapeake, Delaware, and Hudson basins, have had their struggle of ages to reach their respective recipients, and the beds of all yet retain

* See Table V p. 71.

much to remove before their streams can flow with tranquil or equal motion.

This feature in the geography of the United States is highly favourable to canal operations, in forming a union between the Atlantic and central waters. The rivers have, during accumulated centuries, done that which man could not have dared to conceive. The rivers have torn the mountains to their bases, and given to human beings, and the fruits of their toil, a free passage. Man in his feebleness is relieved from labours beyond his aggregate force, and left to remove mere obstructions. When this subject is viewed with the eye of philosophy, it is one of those sources of reflection which gives exercise to every noble faculty of the mind.

Below Tioga Point, the already large volume of the Susquehanna flows a little east of south 15 miles to the north-western foot of the Appalachian system, which it encounters at Towanda creek, near Meansville, in Bradford county, Pennsylvania, and thence, turning to south-east, pierces the first chain, and flowing 30 miles, reaches the Tunkhannock creek and chain, having now passed over the secondary and entered on the transition formation. Breaking the Tunkhannock, and some other chains, the Susquehanna finally, at the mouth of the Lackawannock, 9 miles above the town of Wilkesbarre, enters the Wyoming valley, and winds to the southwest. Continuing the latter course down the mountain valleys about 70 miles, to the influx of the western branch, between the villages of Northumberland and Sunbury.

In all its course of 120 miles, from Tioga Point to Sunbury, the Susquehanna receives no tributary stream of fifty miles comparative course. Wyalusing, Tunkhannock, Lackawannock, and Nescoper from the left, and Towanda, Mahopeny, Bowman's, and Fishing creeks from the right, are merely bold and fine, but only small mountain torrents.

The Western Branch is, in all its extent, exclusively a river of Pennsylvania. Rising far within the central secondary, its extreme western sources in Indiana and Cambria counties, are within 35 miles from the Alleghany river at Kittanning, and about 60 miles from the junction of the Alleghany and Ohio at Pittsburg. Draining sections of Cambria, Indiana, and Clearfield counties by a general course of N. E. 70 miles, the West Branch receives the Sinnamahoning from the north-west, and at the northern angle of Centre county. Below the entrance of Sinnamahoning, the West Branch continues north-east ten miles, thence turning 20 miles to the south-east, receives Bald Eagle river from the south-west. Thus far of its course the West Branch drains the central secondary, but immediately above the influx of the Bald Eagle, it breaks through the Alleghany or main chain of the Appalachian system, and entering on the transition, turns to a little north of east. Receiving the two large creeks Pine and Loyalsack from the northward, and passing Williamsport, this now noble stream continues its course of nearly east, forty miles from Bald Eagle creek to Pennsboro'. In the vicinity of the latter village, the stream turns to nearly south, twenty-five miles to its junction with the north-east branch, at Sunbury, and thirty-five from thence to the influx of the Juniata from the west.

Juniata, the southwest branch of the Susquehanna, rises in and drains the northern part of Bedford county; flowing from the south-eastern side of the Alleghany chain, and thence about 20 miles nearly east, passes Bedford, and rushing through several minor chains, turns abruptly to a course a little east of north 40 miles, receives the Frankstown branch near the borough of Huntingdon. The general course of Frankstown branch is from north-west to south-east, and below their junction the united stream continues that course 15 miles, to its passage

through Jack's mountain, between Huntingdon and Mifflin counties. Again inflected to north-east, the Juniata enters Mifflin county, and pursuing that direction nearly thirty miles, passes Lewistown, and again winding to south-east, breaks through Shade mountain into Tuscarora valley; and thence, crossing that valley, in a course of 10 miles reaches the north-west base of Tuscarora mountain, where it once more bends to the north-east, and following the base of the mountain 10 miles, turns to south-east, and forming a passage through, leaves Mifflin and enters Perry county, over which it continues 15 miles to its junction with the Susquehanna, nearly on the meridian of W. C. and N. lat. $40^{\circ} 23'$.

Like every other branch of the Susquehanna, the Juniata is as noted for the number of its rapids as for its exemption from perpendicular falls. Though originating in, and having its whole course amongst craggy mountains, it is navigable, at high water, to near Bedford. In speculative opinion on the means, and most suitable route, to form a water communication between either the Delaware or Chesapeake basins, and the valley of Ohio, the Juniata has been conspicuously held in view. How far this route is comparatively eligible, is a problem now advancing towards complete solution, by a canal.

The Juniata is the last tributary of importance which enters the Susquehanna. The Conedogwinet, Yellow-Breeches, Conewago, Codorus, and Deer creek, from the right, and below Sunbury on the left, the Mahanoy, Mahantango, Swatara, Conestoga, and Octoraro, are comparatively creeks, none of them having a general course of 50 miles. The Swatara is important, however, as its valley forms part of the route of the Union Canal.

We have already seen that from Pennsboro' to the influx of the Juniata, the Susquehanna pursues a course of very nearly due south 60 miles. Though *not appearing so on our maps, from the deficiency*

of their representation of the chains, the southern course of the Susquehanna, below Pennsboro' to the mouth of the Juniata, is actually the most mountainous part of its course by either branch. Independent of minor ridges, in this distance of 60 miles, this remarkable river traverses six or seven of the principal chains, and even at the last curve to the south-east, below the Juniata, it has not yet passed the Appalachian system, but again in a course of 80 miles, it carries its now immense volume, through the Kittatinny 5 miles above, and through the Blue Ridge, 8 miles below Harrisburg; and lastly, the south-east mountain, below the Conestoga. From the Blue Ridge the channel becomes more and more interrupted with shoals and rapids, until the stream pours over the last rocky ledge, and loses its name and rank as a river in the Chesapeake bay.

The valley of the Susquehanna, from its position naturally and politically, and from its peculiar features, must at all future times attract a full share of attention from the traveller and statesman. I have often observed that rivers were the most diversified objects in nature, and defied generalization most effectually. To be adequately understood, they must be studied individually. The three rivers, Susquehanna, Delaware, and Hudson, are contiguous to each other, and the former has interlocking sources with the two latter, and all pierce the entire Appalachian system; and yet, in those intrinsic features which give character, no three rivers can be more strikingly distinct. It is true, that in their respective courses, the Susquehanna and Delaware present an accordance, which must have arisen from some general and inherent structure of the country they drain; but here the resemblance ceases. Including all its higher, and in particular its north-east branches, the Susquehanna is peculiar in the *physiognomy* of its vallies. Very wide bottoms of *two, and often three stages*, spread along the con-

vex side of the bends; whilst along the concave rise steep, frequently precipitous, and sometimes mountainous banks. Here are at once, and over a large space, combined in never ending variety, the most bold and the most soft and tranquil scenery; the fine glassy surface of the rivers, bordered on one side by wide spreading vales, rising by acclivity after acclivity, and on the other by high swelling or abruptly rocky walls.

Exuberant fertility is here followed on an almost perceptible line, by the sterile though wood-clothed mountain. The varied hue of the foliage again gives a truly rich drapery to the landscape. The natural timber of the bottoms, differ materially from that of the mountains. On the former, sugar-maple, black walnut, elm, beech, and other trees indicative of a productive soil abound. Rising to the higher stage, the deep green of the pine is seen intermingled with the softer and lighter tints of the timber of the vales. On the slopes and even summits of the mountains, we meet the pine, oak, and chesnut, and above the Lackawannock, the hemlock.

As a navigable stream, the Susquehanna is much less interrupted by rapids, or dangerous shoals, than might be expected from the tortuous course it pursues through an extensive mountain system. It is also a feature strongly marked, though common to the other rivers of the Atlantic slope, that where the volume of water passes the particular chains, rapids seldom, and perpendicular falls no where occur.

On so large a space as that of the Susquehanna valley, mere difference of latitude would superinduce a sensible difference of climate; but here respective elevation enters as a very powerful element, in changes of temperature. The mouth of the Susquehanna, at Havre de Grace, is at N. lat. $39^{\circ} 33'$, one degree east from Washington City. The *extreme northern* sources, are, as I have already

noticed, at N. lat. $42^{\circ} 55'$, between one and two degrees east of Washington. This gives a difference of three degrees and twenty minutes of latitude; but by recurrence to table 5th it will be perceived, that the summit level between the Chemung at Newtown and Seneca lake, is 885 feet above the level of the Atlantic tides, and the pass between Newtown and Seneca being a mountain valley, falls far short of the mean elevation of that part of New York comprised in the counties of Tioga, Cortland, Chenango, and Otsego. The latter region is safely estimated at a height of 1000 feet, or equivalent to at least $2\frac{1}{2}$ degrees of latitude. Thus we find, that in effect, the climate of the basin of Susquehanna differs upwards of five degrees in temperature. Again, if we examine the relative position of the mountain valleys of Pennsylvania, drained by the West-Branch, and the Juniata, and compare the elements in tables 4 and 5; we are warranted in stating the mean height of that region at 1200 feet, or equivalent to three degrees of latitude. Therefore, all the higher sources of the Susquehanna, flow virtually from N. lat. 44° or 45° , if reduced to the ocean level.

Though much less extensive than the preceding, the basin of the Delaware is a very important link in the chain of rivers along the Atlantic slope. The Delaware rises by two branches in the western spurs of the Catsbergs. The Coquago to the north-west, and the Popachton to the south-east, flow from their sources, south-west 50 miles, draining the central and south-eastern part of Delaware county, New York. Reaching within 5 miles from the north-east angle of Pennsylvania, and within 10 from the Susquehanna river, the Coquago turns to south-east, and continuing that course 15 or 16 miles, receives the Popachton. With rather serpentine individual windings, the Delaware maintains a south-east direction *60 miles from the north-east angle of Pennsylvania*

to the mouth of the Nevisink river from Orange county, New-York. Encountering the Kittatinny chain of mountains, the Delaware then turns to south-west, almost washing the mountain base, 35 miles, to the mouth of Broadhead's creek, from Pike and Northampton counties. Curving to the south, the Delaware now passes the Kittatinny by what is usually called the Delaware water gap, and enters the fine mountain valley between the Kittatinny and Blue Ridge chains. Continuing south, it receives the first large confluent, the Lehigh, at the foot of the latter ridge, and opposite Easton; then pierces that chain, and again 5 miles below, breaks through the south-east mountain, and winds to the south-east, having flowed in a southern direction 30 miles. Pursuing a south-eastern course of 35 miles below the south-east mountain, falls over the primitive ledge at Trenton, there meets the Atlantic tide, and at Bordentown, five miles still lower, once again bends to south-west. Passing along or near the outer verge of the primitive, this now widening stream continues 40 miles, passes Philadelphia; 5 miles below that city, receives the Schuylkill, from the north-west; and thence passing Chester, Wilmington, and Newcastle, opens into a bay 5 miles below the latter village. The Delaware bay again turns and opens to the Atlantic ocean to the south-east.

The length of the Delaware from the Catsbergs to tide water at Trenton is 185 miles, and 120 from the rapids at Trenton to the Atlantic ocean, having an entire comparative course of 305 miles. Though rolling over numerous rapids, no cataracts, in the true sense of that term, interrupt the navigation of this river, which, at seasons of high water, extends by both branches into New York. The general course is very nearly from north to south, along a meridian two degrees east from W. C.

Similar to the Susquehanna and the Potomac, the

Delaware receives its only two large confluent from the right. These are the Lehigh and Schuylkill.

From the position of their valleys as channels of inter-communication, and from the mineral treasures found along their mountain sources, the Schuylkill and the Lehigh have become of great importance. The Lehigh rises by various mountain branches in Northampton, Pike, Wayne, and Luzerne counties, uniting below Stoddartsville, and forming a small and precipitous river current, which pouring first to the south-west, gradually turns south, and thence south-east, passes Mauch Chunk village, and struggling between mountain masses, finally escapes through the Kittatinny range, and continuing to the south-east, meets the north-west base of the Blue Ridge at Allentown, in Lehigh county. Here it turns to the north-east, along the foot of the latter chain, and passing Bethlehem joins the Delaware at Easton. The Lehigh is truly a mountain torrent. There is perhaps no other stream of the United States, except Schoharie in New York, of equal length, which presents so great difference of level between the points of source and discharge.

In comparative course, it is about 25 miles from Stoddartsville to Mauch Chunk, and the intermediate fall amounts to 845 feet. Ten miles below Mauch Chunk, in a direct line, this stream passes the Kittatinny, and in the intermediate space falls 245 feet. From the Lehigh water gap, or passage through the Kittatinny, to its junction with the Delaware, it falls 205 feet in a comparative course of 35 miles. The entire fall from Stoddartsville to Easton being 1210 feet: comparative course 70 miles, or upwards of 17 feet to the mile. The distance from the town of Stoddartsville to the extreme source is from 15 to 20 miles, with a fall it is probable of 500 feet, giving to this small river a course of 100 miles, and fall of 1700 feet; and what may be con-

sidered in a peculiar manner remarkable, no actual cataract worthy notice exists in all its course.

Above the water gap, the bed of the Lehigh lies at the base of steeply rising and often precipitous mountains, leaving between them seldom more space than the mere width of the stream. The scenery is in a high degree wild, grand, picturesque, and frequently sublime. Below the Kittatinny, the features of nature are less magnificent, but still follow in a romantic succession of strongly contrasted and elegant landscape. This varied and pleasing character of its shores gives a delightful diversity to the vicinity of Allentown, Bethlehem, and Easton. The banks of this beautiful river most highly reward the enlightened traveller; one scene alone upon it would repay a journey of many hundred miles; that scene is Mauch Chunk, with its inexhaustible mines of coal, and the stupendous works erected and erecting to procure this valuable mineral.

The Lehigh is now rendered navigable by dams and falling locks for some distance above Mauch Chunk. This very useful and arduous work has been effected by the Lehigh Coal and Navigation Company, under the direction of White and Hazard, the superintending engineers. The discovery of immense masses of anthracite coal, made in its vicinity, led to the improvement of the river, and the roads leading from it to the mines.

Similar mineral wealth in interminable strata of anthracite coal, led to the improvement and importance of the Schuylkill. The latter rises in and drains about the five-eighths of Schuylkill county. Formed by two branches interlocking sources with the Lehigh, Nescopeck, Cattawissa, Mahanoy, Mahantango, and Swatara, the Schuylkill bursts through the Kittatinny chain, between Berks and Schuylkill counties, after a course of 35 miles from the west. Below its passage through the Kittatinny, it turns to nearly south 20 miles, in which distance it has received

Maiden creek from the north, and Tulpehocken from the west, and passes Reading, immediately below which town it pierces Blue Ridge, and assumes a south-eastern course. In the latter direction this river continues to the environs of Philadelphia 50 miles, winding to nearly south at the mouth of the Wissahiccon, and, passing through the western part of Philadelphia, is lost in the superior volume of the Delaware 5 miles below that city.

The entire comparative length of the valley of the Schuylkill is about 100 miles, 20 above and 80 below the Kittatinny chain.

A strong resemblance is perceivable between the Schuylkill and Lehigh, though the scenery along the former is less rugged and rich than upon the latter stream. Flowing from the same mountain valley, the soil and mineral productions are in a great measure similar on the two streams: but *in situ*, the respective masses of anthracite are very differently distributed, in the Mauch Chunk mountain, and any other mine of that fossil which I have visited or been made acquainted with in either the Delaware or Susquehanna basins. That of Mauch Chunk lies in immense irregular strata, open in one place to the day on the summit of the mountain, and with little if any regular inclination; on the contrary, the mines on the Schuylkill and the valley of Wyoming, near Wilkesbarre, dip like the other incumbent and decumbent strata.

The Schuylkill is now navigable by canals and locks to a few miles above Mount Carbon, near its source, ten miles above Orwicsburg; and the Union Canal Company have completed a channel of water communication by the Tulpehocken and Swatara, into the Susquehanna at Middletown. A canal is again in progress from the Delaware, opposite Easton, through New Jersey, which when opened will serve as an aquatic line of transmission between the Delaware and Hudson basins.

Of that part of the Delaware basin comprised in New Jersey little need be said, no large tributary stream entering from that section, composed of a strip 200 miles by a mean width of about 15, or 3000 square miles. Small as it is, however, in a general view, that part of the Delaware basin occupies about one-half the State of New Jersey.

Similar to the Susquehanna, the Delaware rises on the western or central secondary, and traverses over all the intermediate formations in its passage to its recipient. The minerals yet discovered in any great abundance in the two basins are, iron and anthracite coal.

Observations made on the climate of the Susquehanna basin may be correctly applied to that of Delaware. The difference of latitude between the mouth of Delaware bay and the sources of Coquago river is $3^{\circ} 45'$, and the difference of elevation at least 1500 feet. Combining these elements, the real difference of temperature will be nearly, if not altogether, seven degrees.

It is a remark that may be made universal, that such rivers as the Susquehanna, Delaware, Hudson, and Connecticut, must have very mitigated spring floods, as the temperature must be at all times higher at the mouth than at the source; and consequently, the ice and snow progressively melt up, and not down the river. In all parts of the earth rivers flowing towards the poles have more rapid and excessive inundations than those otherwise similar in magnitude of volume, but having a reverse course from a more polar to a more southern latitude.

Confining our survey rigidly to the actual surface drained by the given rivers, and contained in the waters flowing into each recipient, has left out of our sketch of the Chesapeake basin any specific notice of that long strip of coast from Cape Charles to Cape Henlopen; and from Cape May to Sandy Hook.

The character of coast noticed as commencing at

the mouth of Pedee or Winyaw bay, is fully preserved along the Atlantic shores from the Chesapeake to New York bay, or, more correctly, outlet of the Hudson. In a distance of 120 miles from Cape Charles to Cape Henlopen, not a single eminence rises; long sandy islands, with extended but shallow sounds, with no opening which merits the title of a harbour. The slope drained into the Atlantic ocean between the Chesapeake and Delaware bays, is therefore in a comprehensive view an uninteresting line of 120 miles, by a mean width of about 5; or area 600 square miles.

Crossing Delaware bay we again traverse another line of Atlantic coast, of similar features and very nearly similar length, but of more depth inland. The Atlantic shore of New Jersey has more numerous, deeper, and more spacious inlets than exist in the preceding range of coast. Great Eggharbour, Little Eggharbour, Barnegat, Tom's bay, Shark inlet, and the united bays of Shrewsbury and Nevisink, and some other inlets of lesser note of New Jersey, afford shelter to vessels of considerable draught. The general surface, though still monotonous, swells perceptibly more above the level of the ocean; and finally, approaching Sandy Hook, rise on the fatigued, but now relieved sight, the Nevisink hills, the first eminence of any height deserving notice from Cape Florida, through $15^{\circ} 30'$ of lat., or, following the coast, more than 1350 miles.

The Atlantic slope of New Jersey is in length, about 125 miles, pursuing the elliptical inflection of the coast, with a mean width of 20 miles; area 2500 square miles.

In respect to temperature, it may be remarked, that the sandy alluvial border of the Atlantic slope, is warmer than can arise comparatively from either its elevation or geographic polar distance. Proximity to an open ocean is one cause of this phenomenon, but the higher temperature of that ocean itself

than could arise from geographic position, must be sought in more remote and controlling causes, and is found in the Trade winds, or rather in the effect of these winds, the Gulf stream.

With the basin of the Delaware terminates the middle section of the Atlantic slope, and before proceeding with a review of the north-eastern section I may be indulged in a few remarks.

I have, on more than one occasion, expressed the opinion, and sustained that opinion from the prominent features of nature, that in every essential respect, the Chesapeake and Delaware peninsula, lower New Jersey, and Long Island were specifically similar; and that Chesapeake bay, Delaware bay, and Long Island sound differed in nature only, in the circumstance of the latter having two entrances to the adjacent ocean.

The Susquehanna and Delaware in the lower part of their courses flow parallel to, rather than towards their recipients. This is so much the case with the latter river, that more than 30 miles above the head of tide water at Trenton, the channel lies parallel to, and distant only from 30 to 40 miles from the opposite Atlantic coast, outside of Amboy bay. A short distance, however, below the head of the tides, the Delaware turns to south-west, and pursues that direction 60 miles, and by a peculiar coincidence, the Susquehanna, after breaking through the Kittatinny and Blue Ridge chains, assumes a south-eastern course of 60 miles. Thus these two noble rivers obliquely approach to within twenty miles of actual confluence. But in place of mingling their streams, the Susquehanna dilates into an immense bay, turns to south, receives numerous and large tributaries from the west, and meets the ocean after having indented the continent 180 miles; the Delaware also rejecting a union with its rival, winds to the south-east, and opens into a wide bay, upwards of 100 miles distant from the entrance of the Chesapeake.

If again we return still farther south, we find a like conformation of coast in the Chowan, and other rivers and sounds.

These observations appear trite and puerile, until we glance at the moral and political effects of such a physical arrangement. In alluvial coasts similar phenomena are to be found over the earth; but compared with the Atlantic coast of the United States, these phenomena are elsewhere very limited in degree. China is, however, the only other region of the earth, with which in respect to any extensive physical theory the United States can be with any correctness compared; and it is truly worthy of attention, that what is called the Grand Canal of China, is only a chain of small artificial connexions with the natural channels of rivers, sounds, and lakes; and that acme of European canal science, the lock, is yet unknown in China. It cannot be deemed national vanity to state, that the territory of the United States, combined with modern science, will in all human probability effect in a brief period of time, not only the most extensive inland navigation, but also the most extensive improvements of that kind which the face of the earth will admit.

CHAPTER V.

GEOGRAPHICAL VIEW OF THE NORTH-EASTERN
SECTION OF THE ATLANTIC SLOPE OF THE
UNITED STATES.

In strictness, the basin of the Hudson, including the minor but important basins of the Rariton and Passaic, is more naturally connected with that of Delaware, than with the Connecticut; and farther, when we examine the Appalachian system of mountains we discover ample lines of demarcation to justify the divisions we have made. If we turn our eye to a good general map of the United States, and commence our review with the mouth of the Alata-maha, we behold from that estuary to Cape Hatteras, the Atlantic coast and the Appalachian system pursuing an almost parallel course of about N. 50° E., and from the Blue Ridge nearly two hundred miles apart.

At Cape Hatteras, the Atlantic coast turns to N. 12° 33' E., if we estimate the whole distance to Amboy bay, distance 426 miles. In this section of the United States, the mountain system and Atlantic coast incline upon each other at an angle of about 40 degrees. By such inclination the mountains approach, and at the outlet of the Hudson range within 25 miles from the ocean.

When delineating the Appalachian system, the great inflection made in New York has been shewn; and that, from the basins of the Susquehanna and Delaware, north-eastward, the range of the mountains are like that of the rivers from north to south. I have also shewn, that the mountain chains were

embedded in the earth in solid cores, which were in many places partially overlaid, and concealed the continuity of the chain, which continuity was in numerous instances demonstrated by the inflections of the rivers. The North River or Hudson is, however, an anomaly in the natural history of Atlantic rivers. On either side of this peculiar chasm in the continent, the Atlantic tides are arrested by or near the primitive strata, but in the Hudson basin tides find a level nearly 150 miles above the outer verge of the primitive, and penetrate to contact with the central secondary.

The Hudson is formed by two branches, the Hudson proper, and the Mohawk. Each of these confluents deserves particular attention from having become the channels of canals actually executed and now in full use. The Mohawk rises principally in Oneida county, interlocking with Black river of Lake Ontario; flowing south about 20 miles, it suddenly turns to south-east at Rome. Here is the highest summit level, from Hudson river, near Albany, into Lake Ontario, 421 feet above the tides in the Atlantic ocean. In a state of nature, the waters of the Mohawk, at Rome, in high floods, divide; one part following the channel towards the Hudson, and the other part flowed down Wood creek into Oneida lake; consequently, the upper Mohawk had two recipients, the Hudson and St. Lawrence. Since used as a part of the Erie canal, the level, near Rome is continued each way, and the canal carried upwards of 60 miles on one plain. From this table land the Mohawk flows south-east 28 miles to where it receives the first considerable northern confluent West Canada, about one mile below the village of Herkimer. Here it assumes nearly an easterly course of five miles to the Little Falls, where it passes the Catsberg chain over a ledge of primitive rocks. Below the Little Falls the Mohawk turns to *S. E.* by *E.* 70 miles, receives East Canada from

the north, and Schoharie from the south, passes over the Cahoes Falls, and joins the Hudson at Waterford, after an entire comparative course of 123 miles.

This basin is remarkable as forming a deep vale through the chains of the Appalachian system; and for rising on the central secondary and forming its outlet into the ocean tides. The Erie-canal is carried, except in one instance, between Schenectady and Albany, along the right or southern side. The extreme north-western source of this fine river is in Lewis county, N. lat. $43^{\circ} 31'$, long. W. C. $1^{\circ} 35' E.$; its junction with the Hudson at N. lat. $42^{\circ} 46'$, long. W. C. $3^{\circ} 20' E.$

The Hudson is formed by two branches, Hudson proper and Sacondago. The remote north-western sources of the Hudson rise at once in a mountainous and marshy region of Essex and Hamilton counties; but another branch called the N. E. Hudson rises in Essex, between the main branch and Lake George. After a general course S. S. E. of 40 miles each, the two branches unite in Warren, and continuing south 15 miles, receives the Sacondago, between Warren and Saratoga. The Sacondago rises, one branch in the western part of Warren, and another in the south-eastern angle of Hamilton. Flowing south about 40 miles, to the village of Fish-house, now Northampton, on the line between Montgomery and Saratoga, the Sacondago rapidly turns to N. N. E. 20 miles, and thence gradually curving to the east joins the Hudson, below Jessup's Falls. The united stream, now a considerable river, flows a little E. of S. 15 miles, is again precipitated over a ledge of rocks, called the Great Falls; bends to north-east 20 miles, is once more borne over another stratum, and forms Glenn's Falls.

It is at the latter falls, that the Hudson enters that most peculiar valley, perhaps in the world, and *which has been noticed in Chapter II.—p. 80, 81.*

Of this interesting vale, the highest elevation above tide water is the plain between Glenn's Falls and Wood creek, a small confluent of Lake Champlain entering at White Hall. This plain, only 140 feet above tide level, is the lowest summit level between the surface of the Atlantic and that of the St. Lawrence basin. Advancing northward beyond the Wood creek level, by a descent of $52\frac{1}{2}$ feet, we are brought to the verge of Lake Champlain. The mind is with difficulty, even by aid of mathematical demonstration, led to believe that this expansive sheet of water is only $87\frac{1}{2}$ feet above the surface of the Atlantic ocean: surrounded by the most imposing mountain scenery, the traveller on the shore of Lake Champlain, seems in imagination raised to Alpine heights, and feels unwilling to acknowledge, even to his own mind, that less than one hundred feet lockage along the Chambly and St. Lawrence, would bring him down to the swell of the ocean.

There is but one more pass known on the earth having a specific resemblance to that of Hudson and Lake Champlain. Scotland is divided into two unequal sections, by what is well expressed in that country by the term Glen, signifying a narrow and deep vale between high and steep hills or mountains. The Scottish glen declines a little towards the meridians from north-east and south-west, extending from the Atlantic ocean into the German sea, about 120 miles; having no summit above 70 feet, though bounded by high and craggy mountains.

In one respect these two vales excite astonishment; in their extent they deviate so little from a direct line as to almost appear the effects of large masses of solid matter having been impelled with prodigious velocity over the earth's surface. In both, the lakes as well as the rivers obey the general direction; and in the Scottish glen, the Murray *frith*, Loch Ness, Loch Oich, Loch Lochi, Loch Eil, and the *frith* or Loch Linhe, supply the same office

performed in North America by Hudson river, Wood creek, Lake Champlain, and Chambly river. Both passes have been recently made navigable; that in North America by the Champlain canal, and that in Scotland by the Caledonian canal. Perhaps no two facts in history more strongly mark the progressive advance, not alone of improvements in means of transportation, but in an infinitely more important subject, the human mind. But we must resume our survey.

• Falling over Glenn's Falls, the Hudson turns to a course a little west of south, which it maintains with slight deviation 186 miles to the Atlantic ocean at Sandy Hook. Thirty-five in a direct line, but 43 following the river, and by a fall of 104 feet, the volume flows from Glenn's Falls, to the tide level at the junction of the Hudson and Mohawk. Below tide water, though the character of a river is imperceptibly changed to that of a bay, the mean breadth would not amount to one mile. In all its length above the island on which New York stands, it is bordered by a very rapid acclivity. This acclivity is in many places precipitous mountain masses, but in some other places more gentle. Few rivers of the world afford a more rapidly varying suit of landscapes. Leaving the city of New York, the channel appears as an interminable vista, lined on the western shore by appalling walls of primitive rocks; on the other a highly cultivated country sweeps by a bold acclivity from the river brink. These contrasts continue to the Highlands, where enormous mountain peaks rise at once on both sides to an elevation of 1200 or 1500 feet. The channel seems to have been rifted by some force too overwhelming to admit pleasing contemplation. We feel that when such chasms were burst, the earth itself must have trembled to its centre. This is a pass that few can traverse without sensations of deep interest. *It is the only instance known, except that*

of the St. Lawrence, of the ocean tides passing through a primitive mountain chain, and carrying depth for the largest vessels. Ascending through the Highlands past West Point, a new world seems to open; the banks remain bold, rocky, and often precipitous, though not mountainous; the farm-houses and villages seem to hang upon the cliffs, or to rise by stages from the water edge. In a few places bottoms occur, but they are rare and limited in extent. In brief, if performed in open day, a voyage along the Hudson is one of the most desirable in the United States; but generally, in a passage by a steamboat, one or other extremity is made in the night, and of course unseen by the passengers.

Flowing in a deep chasm, the Hudson is seldom seen, and in no place to advantage, from the roads along either bank. The adjacent country rises abruptly to upwards of two hundred feet, and thence sweeps backward to the mountain chains in such manner, that the traveller would seldom suspect from the ordinary appearances that a large river covered with vessels flowed in the vicinity. This is the case in some of the villages, particularly Poughkeepsie and Rhinebeck. Peckskill, Newburg, Hudson, and Albany, rise by stages from the river. West Point stands on a high though confined plain. Troy is the only town on this river which has been built on an alluvial bottom. Following the Hudson proper, above the entrance of the Mohawk, the features of the united stream are generally preserved; but along the latter a new character of scenery prevails. Above the Cahoes Falls secondary rock forms the substratum, precipices in a few places occur, though of no great elevation; at Schenectady, Herkimer, Utica, and Rome, extensive flats spread between the hills. The Herkimer flats above the Little Falls have all the appearance of having once formed the bottom of a lake. In general, however, *the banks rise by gentle ascent, giving a soft and*

pleasing, rather than romantic air to the landscape. At the Little Falls the scenery is wild and broken, and above the village, strongly contrasted with the expansive alluvial bottoms of Herkimer. Here are incontestible monuments of a change of height in the ledge which crosses the river. The action of the water on the rocks is visible 30 or 40 feet above the present level of the stream. Such an elevation would inundate the valley of the river to Rome; and every indication of the intermediate space exhibits traces of not very ancient submersion; and as the surface became more and more exposed as the barrier wore lower, extensive marshes must have existed between the periods of actual submersion and desiccation of the soil.

As a navigable channel, that of the Mohawk is of invaluable importance. The little elevation of its summit level afforded an easy execution of a canal along its banks, which facility was again enhanced by the nature of the banks themselves, and still more by a contiguous country of exuberant fertility.

In respect to the mountain valleys, the Hudson basin is divided into three sub-basins. The higher and most extensive above the Catsbergs; the middle between the Catsbergs and the Highlands, and the lower south from the Highlands.

The upper or northern basin includes an irregularly limited space, with a base of 140 miles from the sources of the Ancram and Claverack creeks, to those of the Mohawk, and perpendicular of 130, with an area of 9000 square miles. The relative elevation, is in an inverse ratio to the distance from the ocean. The southern limit of the basin west from the Hudson, the Catsbergs, rise in Windham Green county to near 4000 feet. The Round Top is 3804, and the High Peak 3718 feet above the tide level of the Hudson, about 18 miles distant. This is the highest mountain elevation, excepting perhaps the Peaks of Otter, of the Appalachian system.

south-west from the Hudson. The small river Schoharie rises in the Catsbergs, and in their most elevated valleys, flows first north-west but turns to northward, and enters the Mohawk, 42 miles by the windings of the latter above its mouth. The Schoharie in a course of only 60 miles falls upwards of 3000 feet, and enters its recipient 286 feet above tide level. The extreme north-western sources of the Mohawk are perhaps about 1000 feet above tide level, consequently the fountains of the Schoharie are 2500 feet above those of the Mohawk.

The continuation of the Catsbergs, after they pass the Mohawk at the Little Falls, are known in Herkimer, Montgomery, and Hamilton counties as the Sacondago chain. This chain, in Hamilton, forms a nucleus from which the rivers flow like radii from a common centre, but its elevation has never been ascertained with precision. Standing on the heights between Ballston Spa, and Schenectady, where the Catsbergs, distant 45 miles, the Green Mountain chain of Massachusetts and Vermont, distant 40 miles, and the Sacondago, distant 40 miles, are all distinctly seen, and comparing each with the others, I should be led to give an elevation of at least from 1200 to 1500 feet to the latter chain. If the preceding estimate is correct, the Hudson flows from a table land of upwards of 1000 feet elevation.

On the eastern side of the Hudson, again the Green Mountain chain of Vermont, Massachusetts, and even Connecticut, rises as an immense buttress from which the branches of the Connecticut river and Housatonick are poured with great rapidity. Into the superior basin of the Hudson are discharged from the Green Mountains westward, the small but impetuous streams of Batten Kill, Hoosack, Kinderhook, and Claverack. The longest of these creeks, the Hoosack, has a comparative course of about 30 miles; but the mean slope of the basin, from the table land on which the Green Mountains

stand, does not amount to 20 miles in width. The table land is at least 1000 feet above tide level, therefore this narrow slope falls that depression in 20 miles, or in 105,600 feet.

The preceding elements will enable the reader to conceive the general features of this singular region. If we turn our attention to a map of New York, and take the head of tide water in Hudson river or bay as a point of observation, we behold a deep chasm into which are poured numerous rivers of greater or less magnitude, and of these radiating streams the one coming from the greatest distance inland flowing from the least elevated table land.

As respects geographic position, this superior basin extends from N. lat. $42^{\circ} 08'$ to N. lat. $44^{\circ} 08'$, and in long. from W. C. from $1^{\circ} 30'$ to 4° E. It will, however, be at once perceived, that in a region where relative height is so peculiarly distributed, that lines of latitude are only one set of elements in forming a theory of temperature, we might expect to find rapid transitions in the seasons, on very limited change of place, and such is the case. I have been in Albany with every appearance of opening spring, whilst snow and ice were abundant within 20 miles in almost any direction. The difference of temperature between New York and Albany is also much greater than could be calculated from not quite two degrees of latitude upon an equal level. The great depression of the thermometer at Albany, arises, in part, from the surrounding mountains, but probably more from the deep vales of the Mohawk and Hudson opening vents for the winds of the north and north-west.

The middle sub-basin of the Hudson, between the Catsbergs and the Highland mountains, lies in form of a parallelogram of about 40 by 50 miles, or 2000 square miles. The features of this tract are in themselves strongly illustrative of the superficial structure of the Hudson and Delaware basins. If

we recur to the notice of the latter basin, we find that the Kittatinny chain leaves Pennsylvania and crosses Delaware river at the mouth of Broadhead's creek, and continuing a north-east course through New Jersey, enters Orange county, New York, at the great bend of Delaware, below the mouth of Nevisink river. This chain is continuous across Orange, Sullivan, and into Ulster county. One of its ramifications is known as Shawangunk, in the south-west part of Ulster.

The Blue Ridge passes Delaware river at the mouth of the Lehigh below Easton, and is also perpetuated in, and over New Jersey. In the latter state, by the common negligence of map makers, the Blue Ridge is sometimes omitted, and if noticed, confounded with the South-east mountain. The latter separates Bucks county from Lehigh and Northampton, whilst the former, about 5 miles more north-westwardly, passes the southern part of Lehigh, turns the course of Lehigh river at Allentown, and as has been stated, enters New Jersey opposite Easton. In their prolongation towards the basin of the Hudson, the two chains, generally humble in point of either mass or height, remain distinct, the Pohatcong and Musconetcong rivers draining the narrow intermediate valley upwards of 40 miles. Inflecting, as do the whole Appalachian system, to the north between the main volumes of Hudson and Delaware, the Blue Ridge is continuous to the former, and forms the Highlands. The South-east mountain also sustaining its identity and close range with the Blue Ridge, the two chains are apparently, but not really, blended in the Highlands. It has been almost universally overlooked, that West Point Military Academy was situated in a mountain valley between two chains. This interesting fact was introduced in this place as a necessary feature in delineating the middle basin of the Hudson.

It must be evident from the data given, that deep

mountain vallies extend in an oblique direction between the two basins of Delaware and Hudson; and also from the Hudson into the basin of St. Lawrence. This is so far the case, that if the highland strait below Newburg was closed only about 160 feet above the present tide level, the whole mass of water above would leave the basin by the route of Lake Champlain, and Chambly rivers; or if the latter opening did not exist, a rise of 400 feet in the Hudson level would precipitate its discharge into the Delaware, along the vale of the Wall-Kill and Pawlin's creek.

Pawlin's creek rises in Sussex county, New Jersey, and flowing south-west, along, or near, and parallel to the Kittatinny chain, enters Delaware river about 4 miles below Delaware Water Gap, after a course of 25 miles. The Wall-Kill heads also in Sussex county, New Jersey, interlocking sources with Musconetcong and Pawlin's creek, but, flowing in an opposite direction, follows the north-eastern range of the mountain chains 65 miles, and falls into the Hudson at Eddyville near Kingston. The course and features of this latter stream are real phenomena. Influenced as it evidently is, by the mountain structure of the region over which it flows, the Wall-Kill valley has its inclination directly in an opposite course to either of the much greater rivers in its vicinity. It is not 30 miles from the head of tide water in the Passaic to the sources of the Wall-Kill, whilst the influx of the latter with the Hudson is upwards of 80 miles above the city of New York.

The character of country drained by the Wall-Kill is still more a subject of interesting investigation, than even its anomalous course. In Sussex county, of New Jersey, and Orange county, of New York, the upper part of the valley of this stream has all the aspect of an inundated estuary, and is with propriety called the drowned lands. From 35 to

40 miles in length, with from 5 to 7 miles wide, this tract is demonstrably the remains of a lake yet but partially desiccated; it is in most places as flat and marshy as the shores of any part of Louisiana, and the eye involuntarily seeks at every step the open ocean. To the mind of the geographer it suggests the once general aspect of the Appalachian vallies. The numerous *gaps* without existing streams, and other passes where rivers continue to flow, with a combination of relics, attest the former existence of extensive lakes, which the abrasion of flowing water has drained. In the very slow progress of drainage, flat swamps would of course succeed to actual submersion.* The "Drowned Lands" are not, however, altogether reduced to the marshy state; some small lakes lie scattered over this region, which are perennially supplied with water. It is in reality on a small scale what, in early and remote ages, was much of the present most productive soil of the United States.

At the risk of being thought minute beyond necessity, I cannot neglect to notice Esopus creek, another small confluent of the middle Hudson basin. The Esopus rises in the eastern spurs of the Catsbergs, in the southern part of Greene and northern of Ulster county. Flowing in a very direct north-east course 25 miles, until within four miles from the Wall-Kill at the mouth of Rendout creek, it thence winds abruptly to north of north-east, and flows upwards of twenty miles, almost parallel to the Hudson, before it enters that recipient at Saugerties. For several miles on each side of Kingston or Esopus, the Wall-Kill and Esopus run parallel at about three miles distance from each other, and for the last ten miles of its course above Kingston, the peninsula between it and the Hudson is in no one place three miles wide.

* See Mohawk Valley.

On the eastern side of the Hudson, the slope of the middle basin is more confined in its width than the western. The continuation of the Blue Ridge from the Hudson above West Point, inclines north-east along the southern side of Dutchess county about 20 miles, and thence turns to a little east of north, almost parallel to Hudson river, distant about 20 miles; and which course and distance from the Hudson and Champlain basin, are preserved with very partial inflections into Lower Canada.

From this chain, in the middle basin, flow into Hudson the small but rapid creeks, Jansen's creek, Wappinger's creek, and Fish-Kill, each supplying an immense water power, from the perennial steadiness of discharge and very great descent of volume.

Jansen's creek, more frequently designated Ancram creek, from the much and justly celebrated iron works on it, rises in the Blue Ridge, and flowing south-west over the south-east angle of Columbia fifteen miles, winds by a regular curve, in the northern part of Dutchess, to a north-west direction, re-enters Columbia, and joins the Hudson about three miles below the village and mouth of the Catskill.

Wappinger's and Fishkill creeks rise within and have their entire course in Dutchess county, flowing from north-east to south-west; the latter entering Hudson directly opposite Newburg, and at the northern foot of the Blue Ridge, called there, with great absurdity, Fishkill mountains.

The melting of the ice, the advance of vegetation in spring, and the cutting of grass and grain, evince a remarkable difference of temperature above and below the Blue Ridge or Highlands. So great a change in so short a distance, arises, no doubt, from the intervening mountains, as the general elevation of the banks remains nearly the same. In soil, climate, diversity of surface, and advanced cultivation,

the three counties of New-York—Orange, Ulster, and Dutchess—great part of each of which are comprised in the middle valley of the Hudson, form one of the most desirable sections of the United States. The three counties contained in 1820 an aggregate population of 118,000, or 38 to the square mile; though those parts near the Hudson were much more densely peopled. Lying in the direct route of one of the most frequented thoroughfares in America, this part of New-York offers a rich reward to the traveller, and a most commodious residence to those whose means permit the enjoyment of cultivated retirement from the business, but who desire to retain the luxuries of society.

The outer, lower, and southern basin of the Hudson, has become a section of the earth demanding the highest attention from the geographer. The city of New-York, already ranking in the first list of emporia, is augmenting in population, wealth, and trade, with a rapidity and promised stability, of which the history of human improvement affords no other equal instance.

By the estuary of the Hudson in this view is meant, that indenting of the coast of the Atlantic ocean, between the western end of Long Island and Sandy Hook in New-Jersey. This bay, known locally by the name of Amboy bay, receives the Hudson from the north, the Passaic from the north-west, and the Rariton from the west. Taken with this extent, the lower basin of the Hudson extends from the southern sources of the Millstone branch of Rariton, N. lat. $40^{\circ} 13'$, to the mountains below West Point, N. lat. $41^{\circ} 23'$, and in long. from the extreme western sources of the Rariton, $2^{\circ} 02'$ E. to the eastern sources of Croton river, $3^{\circ} 48'$ E. W. C. The direction of this basin is from N. N. E. to S. S. W., about one hundred miles in length, with a mean width of *thirty-five*; area, 3500 square miles.

For all moral and political purposes, Long Island

is connected with the basin of the Hudson, and even physically the connection between the two tracts is so intimate as to warrant their union in a general view.

So much has already been given on the Hudson itself, that little need be added in this place. From the foot of the Highlands to the city of New-York is within a small fraction of 50 miles. At the point on which the lower part of the city is built, the Hudson dilates into a spacious basin of about 5 by 4 miles; into the north-east angle of which the East river or the western termination of Long Island sound enters, and gives to the city of New-York two great entrances from the ocean. Staten Island extends in an elliptic form from New-York basin to the mouth of the Rariton, with a length of 12, and mean width of about 5 miles. Between the western end of Long Island and the extreme eastern cape of Staten Island, the Hudson, by the strait called correctly the Narrows, terminates its course in Amboy or Rariton bay.

At the head of Staten Island, and from the south-west angle of New-York basin, a strait of three miles extends into Newark bay, or more precisely, with Passaic bay. This latter sheet of water receives into its northern extremity Passaic and Hackensack rivers, and at its south-west angle contracts into a narrows trait designated Staten Island sound, or "The Kills," which, after a S. S. W. course of 9 miles, forms one mouth with Rariton river into Rariton bay. Thus with Staten Island sound and the Hudson, and with the two entrances from the Atlantic ocean, New-York harbour has four outlets.

When treating on the general structure of the Appalachian system, I have observed that the primitive ledge, or, more accurately, the outer core of that system, ranged through New-Jersey from Trenton. This chain is distinct in Hunterdon, Somerset, Essex, and Bergen counties. In Essex it

risers into considerable ridges, and is visible from the most elevated part of Staten Island, and from Long Island between Brooklyn and Flatbush, distant about 15 miles from the City of New-York. In most places farther to the southward, the primitive strata ends in an abrupt ledge, but in the vicinity of New-York it extends open to the day, and underlays the shores of the main land and islands around that city. In the basin we are now surveying, the range of the rock strata is in a perfect accordance with that of the section of the Appalachian system to the north-west from New-York. I have shown, when treating of the mountain systems generally, that the Appalachian, in Pennsylvania, New-York, and New-Jersey, curves to the north. The convexity of this curve is in the latter state and vicinity of the city of New-York. We now proceed to examine in detail the minor sections of the lower, or sub-basin of the Hudson; a survey, from the relative importance and peculiar physical features of this region, and the commercial, moral, and political importance of New-York, necessarily minute.

Amboy bay, or the real mouth of the Hudson, is, in respect to the Appalachian system, the extreme concavity of the great middle bay of the Atlantic slope. Into the south-west angle of this indenting, the small tide river the Rariton is poured from New Jersey. The Rariton is formed by three branches; the Rariton proper, Millstone and Alamatong rivers. The Rariton river rises in the south-east mountain, at N. lat. $40^{\circ} 55'$, long. W. C. $2^{\circ} 16' E.$, and in Morris county; assuming a south-west course of 25 miles, passing into Hunterdon, and, curving to south-east 12 miles, enters Somerset; in the latter, inflecting to an eastern course of 15 miles, in which the main stream is augmented from the north by the Alamatong, or Black river; and below their junction the united water passing Somerville, three miles below, receives Millstone river from the south.

Millstone river rises in the western part of Monmouth county, N. lat. $40^{\circ} 14'$, on the sea sand alluvion, and by an anomalous course, which has no other similar case in the United States, flows north-west from the alluvial over the outer verge of the primitive strata. The Assanpink creek of Delaware, heads with and flows parallel to Millstone, about twelve miles, until each encounters the primitive ledge; here the former is turned south-west into Delaware, which it enters at the head of tide water at Trenton: on the contrary, the Millstone, receiving Stone creek from the west, crosses the outer primitive, and turning 15 miles nearly in a northern course, unites with the Rariton below Somerville.

After receiving the Millstone, Rariton flows north-east 3 miles, and is again augmented by Green branch at Boundbrook from Essex, and turns to south-east 8 miles to New-Brunswick, where it meets the ocean tides, and thence continuing east 4 miles, quits the primitive and receives South river from the south, and continuing east 8 miles, is lost in Amboy bay.

The small but interesting basin of the Rariton lies in form of a parallelogram, 45 miles in length from south-east to north-west, and 24 wide from south-west to north-east; area, 1080 square miles. The ocean tides only penetrate to New-Brunswick, 12 miles. Lying within the limits of two-thirds of a degree of latitude, the transition of climate between the northern and southern extremes is very striking. I travelled from Newtown in Sussex county in the latter part of September 1823, over the intermediate mountains, and down the valley of the Rariton. I left Newtown on the morning of the 28th, with a heavy white frost, the effects of which were gradually diminished advancing through the western part of Morris and northern of Hunterdon counties, and slightly visible between Somerville and Trenton. Here relative elevation and more southern latitude combine to produce a melioration of temperature.

It is, however, from the facility it offers to artificial inland navigation, that this basin demands most attention. Extending almost parallel to that reach of the Delaware from South-east mountain to Trenton, the sources of the Rariton rise within five miles of the former river, and continue not very variant from that proximity 35 miles. Within these limits two canal routes have been proposed ; one by the Rariton, and the other by the Assanpink and Millstone rivers. The singular departure of the latter from the otherwise universal course of the Atlantic rivers of the United States, as respects the primitive rocks, offers a *unique* opening from the Atlantic alluvion over the primitive formation. This subject will again be noticed under the head of New-Jersey.

Naturally connected with that of Rariton, follows the still less extensive sub-basin of Passaic. The small bay of Newark, between Essex and Bergen counties, is the common estuary of Passaic and Hackinsack rivers.

Passaic, entering their common recipient at Newark, is formed by two branches, Pompton or Ramapo, and Passaic proper. The Ramapo rises in the south-east mountain in Orange county, New-York ; flowing thence nearly due south, about fifteen miles, passes the western angle of Rockland county, and enters New-Jersey. Thence turning to S. S. W. ten miles, receives from the north-west the Pequannack, and inflecting again to the south five miles, unites with the Passaic, between Morris and Bergen, and opposite Essex county.

The Passaic rises in Somerset county, within the curve of Black river and Rariton, and flowing thence 15 miles, forming for the greater part of the distance the boundary between Morris and Essex. Gradually winding to the north 10 miles, receives the Rockaway from the west. Though the extreme source of the Rockaway is in Sussex, it is mostly a *stream of Morris county*, with a general course of

about twenty miles. Below the union of its main branches, the Passaic winds by a circular curve five or six miles, and gaining an eastern course receives the Pompton from the north.

Thus far the Passaic drains a region, which, though not generally so considered, is in reality a mountain valley. It is, however, only in New Jersey and New York that the primitive ledge is surmounted by eminences assuming the mountain form. Passing the Delaware at Trenton, and advancing along the turnpike road to New Brunswick, a ridge is seen to the left, which, as has been noticed, is traversed by the Millstone river. The chain is again broken by the Rariton, between New Brunswick and Boundbrook, and becomes so elevated in Essex county as to be known as the Newark mountains. Once more this chain is broken by the Passaic, which passes it between Essex and Bergen counties, and stretching over the latter into New York is there again recognized in the Haverstraw mountains in Rockland county, and is the chain which passes the Hudson near Peekskill.

The general courses of the Pompton and Passaic, are directly towards each other, down the western side of the chain we have delineated, but when near actual confluence, the latter stream bends to the east by a regular curve, and receiving the former at the mountain foot, the aggregate stream, assuming a south-eastern course of two miles, enters the mountain chain, and again bends to north-east about two miles, falls over a ledge of rocks, and about four more is again precipitated 59 feet at Patterson. Below Patterson Falls the Passaic curves to a southern course of from 12 to 14 miles to its final egress into Newark bay.

Into the north-east angle of the latter bay is also discharged the unimportant stream the Hackinsack. Viewed on a map, the small pond in Rockland county, *which forms the superior source of the Hackinsack,*

appears almost united to the Hudson; on the contrary, however, they are separated by enormous walls of rock, which, rising at least 400 feet from the Hudson in broken precipices, falls more gradually towards the interior part of Rockland county. From its source to its efflux into Newark bay, the Hackinsack, in a course of 30 miles a little west of south, receives few tributary streams, and though the tide flows up its channel about 20 miles, it is, in a navigable point of view, of little relative importance.

If taken together, the united basins of the Rariton and Passaic are, with a small fraction of Hunterdon and Monmouth, nearly commensurate with Morris, Somerset, Essex, and Bergen counties, in New Jersey, and Rockland, in New York; about 80 miles from north to south, with a mean width of 30 miles; 2400 square miles.

On the eastern or left shore of the Hudson, and in its lower basin, though the face of the country remains bold and broken, the scenery is much less prominent than along and contiguous to the opposite shore. From Westchester county, the small river Croton enters the Hudson at Singing, and through the Bronx is discharged into Long Island sound; from its position it must be included as a stream of the lower Hudson basin. The Bronx also in a very striking manner illustrates the peculiar structure of this basin. Rising in Westchester county, nearly east from the sources of the Hackinsack, those of the Bronx unite, and flowing a little west of south, almost parallel to the Hudson, enter Long Island sound at the head of Flushing bay. If the Bronx, Hudson, Hackinsack and Passaic are viewed together on a map, they appear to flow in channels with so much conformity of course as to mock the efforts of art; and what is still more remarkable, if the review is carried westward to the Delaware, the latter again appears to have received part of its channel from the *same cause which operated to give features to the*

estuary of the Hudson. But even thus far the moulding cause we have noticed does not appear to have been limited. The Susquehanna from Pennsboro' to the mouth of Juniata, has evidently been directed by similar agency, and over a large region we trace in the rivers of Pennsylvania, New Jersey, and New York, a regularity of course which could originate only from some single and powerful cause.

The actual estuary of the Hudson, with its islands and minor rivers, appears to be based on primitive rock, and in fact the channels of the streams to be, though level with tides, similar in other respects to the most elevated mountain gaps. Viewed in this manner, Manhattan Island, Staten Island, and Long Island, are the most prominent elevations of this section of the Appalachian system.

Manhattan, or New York island, is an irregular oblong of twelve, by about one and a half miles, or about 18 square miles. It is bounded west by the Hudson; north, by a small bend of Haerlem straits; east, by the residue of Haerlem straits; and that part of Long Island sound called East river; and south, by New York harbour. The base of this island is kneiss and primitive lime-stone, the range a little E. of N. E. No part of Manhattan island is much elevated, though the surface is waving and in part hilly; the outer edge in its natural state generally an alluvial marsh. The superstratum of the whole island a mass of sand and rounded pebble; the latter of all sizes, from that of sand to rolled masses of several tons weight.

Staten island, extending in a similar direction with the preceding, rests also on primitive rock, and is bounded north, by Newark bay, New York bay, and their small connecting strait; and on the west, by Staten Island sound; on the south and south-east, by Amboy bay; and on the east, by the Narrows, or by the real outlet of the Hudson. Length nearly thirteen, mean breadth four.

and area 52 square miles. This beautiful island rises by a not very gentle acclivity to a considerable elevation. It is similar to Manhattan, bordered by a selvedge of more or less width of alluvion. The surface is, however, highly diversified, and from some of its most elevated hills are opened, perhaps the most variegated landscapes on the Atlantic coast of the United States. It is a place in the vicinity of New York which no traveller ought to neglect. In a clear day, a single hour on some of the hills of Staten island is worth a voyage of considerable length. Around it is an immense sweep of vision over New York, and its treble harbour; Long Island with its swelling hills and numerous farms; the coast of New Jersey, in a circular sweep of 40 miles from Paulus Hook to Nevisink hills and Sandy Hook light-house; and to complete the truly splendid scene, the interminable Atlantic ocean opening between Sandy Hook and Long Island. This noble picture enlivened by all the activity of commerce, decorated by all that art can give to embellish features naturally glowing with all the most attractive lineaments of hill, dale, and diversified water surface. How many who visit New York, with all the means of gratification, and who travel for mere amusement, lose the invaluable pleasure of scanning the rich perspective from Staten Island? Thousands and tens of thousands.

Long Island, though of different form, is in the principles of its structure, in every other respect, similar to Manhattan and Staten Islands. This very important island, extends geographically from N. lat. $40^{\circ} 34'$, to N. lat. $41^{\circ} 10'$, and in long. from W. C. $2^{\circ} 58'$, to $5^{\circ} 8' E.$ Length from the Narrows to Montauk Point, by actual calculation 120 statute miles; the mean range is N. $69^{\circ} 44' E.$ The breadth from the Narrows to Peconic bay, varies from 10 to 18 miles, in a distance of 80 miles. Above, as is usually expressed in reference to the city of New

York, Long Island first widens about 30 miles, and thence more slowly contracts in the next 50 miles to Peconic bay. The latter irregular sheet of water, and its continuance Gardiner's bay, separate the eastern or rather north-eastern part of Long Island, into two peninsulas, the longest and outer of which is terminated by Montauk Point. The interior peninsula, bending out of the general course of the island, curves to N. N. E., ending in Oyster Point, but evidently continued in Plumb island, the two Gull islands, Fisher's island, and the point of the continent south-east from the mouth of Paucatuck river.

A ridge of hills rising in some places to considerable elevation, forms the northern side of Long Island, and might be correctly called its spine; and from which sweeps towards the Atlantic ocean an alluvial margin of from one to five or six miles wide. This extensive plain, with a gentle slope from the interior ridge, is followed by a range of narrow sounds, which extend from the southern outlet of the Narrows, to Sagg point, about 100 miles, and outside of these sounds by a chain of long, and narrow, low sandy islands. When critically examined, it is almost self evident that the intervening alluvial slope or plain has been formed by a similar process, which is yet in progress with the islands, and that, in the lapse of time, the sounds will fill up, and, with the islands, extend the alluvial border some miles farther into the Atlantic ocean. The shore of the main islands within the sounds is very irregular, but that of the sandy islets, exposed to the eternal rage of the Atlantic, stretches, in a finely drawn line, as if every asperity was removed by art. This is, however, a trait in common with all sandy shores exposed to oceans, seas, or large lakes; and it is a feature strongly exemplified along the Atlantic border of the United States.

Though no spot on Long Island affords the expansive landscape which opens from the heights of Staten Island, the scenery of the former is yet highly attractive, and not so monotonous as from the simplicity of its structure might be supposed. The three principal roads, northern, middle, and southern, lead to a pleasing variety of hill, dale, and plain, and in many places present around the traveller the well cultivated fields of the island itself, and beyond, to the north, the bosom of the sound with the hills of Connecticut on the distant horizon. To the south, the beautiful sweep of the plain carries the eye to the never tiring Atlantic. In a tolerably extensive range over the United States, I have seen no part of equal extent more worthy of the traveller's time and expense. The middle road of Long Island, composed of sand and gravel, has the firmness of the latter with the smoothness of the former material, and I have read and enjoyed the landscapes from a carriage without feeling much more sense of uneasy motion, than if in a boat on a tranquil sheet of water.

In addition to its moderate elevation, the temperature of Long Island is influenced, like that of all other islands, by the contiguous ocean, and sound, and is more mild and more moist than the adjacent continent. The difference is even greater than could be expected from the agents we have adduced. The winter seasons of Suffolk county, in Long Island, are indeed very different from those of central New Jersey or central Pennsylvania, with allowance made for difference of elevation and oceanic exposure. Something must be due to the respective components of soil.

The remark may be here repeated, that Long Island sound partakes of the general character of other sounds, along the Atlantic coast of the United States. It is a bay with two outlets to the ocean. *If considered* as extending from the battery at New

York to Fisher's Island, the length of the sound is almost to a mile the same as Long Island; and though the position of the parts is in reverse order, the shape and area are very nearly similar.

Long Island we have shewn to be 120 miles long, with a mean breadth of about nine, or area 1080 square miles. The widest part of the island is from Lloyd's Neck on the sound, along the line between King's and Queen's counties 20 miles; the widest part of the sound is in a line a little east of south, from New Haven harbour to River head in Long Island, within less than one mile of the longer diameter of that island. Proceeding from New York, the sound by a very tortuous course of 16 miles, varies from half a mile to two miles wide. Of this distance, from the battery to Haerlem river is N. N. E. eight miles, and thence again by a like distance nearly E. to Frog Point. The bend opposite Haerlem river is the noted pass called Hell-gate, or Hurl-gate. Above Frog Point, the sound, properly speaking, commences, and turns to N. E. 18 miles between Lloyd's Neck and Stamford in Connecticut. Thus far the shores are rugged and the channel rocky, and much interrupted by small islets, and projecting points; but beyond Lloyd's Neck it opens into a noble elliptical expanse of water, from 8 to 20 miles wide, and with depth sufficient for the largest vessels of commerce or war. This splendid bay presents along its northern shore a continued picture of gradually rising hills, bold promontories, and commodious havens. Beside many of lesser note, it receives from Connecticut, the rivers Houssatonick, Wallingford, Connecticut, Thames, and Paucatuck. The deeply indented shores are decorated by the towns of Greenwich; Stamford, Norwalk, Fairfield, Bridgeport, Stratford, Milford, New Haven, Brandford, Guildford, Killingworth, Saybrook, New London, and Stonington.

It is when leaving New York, and traversing the variegated promontories of West Chester county, and of Connecticut, that the traveller feels the strong contrast with the monotonous sea border, south-west from the Hudson basin. Advancing up the sound of Long Island the eye perceives at every step that a new region is entered, and the imagination is roused by landscapes becoming richer, bolder, and more varied, at every inflection of the road.

It would be no very violent stretch of theory, to consider the rivers entering the northern side of Long Island sound, as forming part of Hudson basin; but in order to preserve perspicuity, I shall survey each individually.

With some small intervening creeks, and at a distance of about 55 miles from New York, Houssatonick river enters Long Island sound. It has already been shewn, that between the Delaware and Hudson basins, the Appalachian system by a circular curve, declined from a north-eastern to a northern direction. A natural consequence of such a curve in a system containing several chains, must be to give a more and more extended sweep to those on the convex side of the circuit. We have shewn, that the Kittatinny chain was continued in the Catsbergs; that the Blue Ridge was continuous over New Jersey, and again in New York extended to, and was broken by the Hudson, below Newburg; and that the south-east mountain of Virginia, and Pennsylvania, was also distinct over New Jersey and New York to the Hudson, which it crossed below West Point. It is one of the many instances of the singular inattention of map compilers to the mountain chains, that the two chains which traverse Hudson below Newburg have been confounded, or the exterior chain altogether omitted; and yet it is the continuation of this neglected south-east mountain which forms the great separating spine between the Hudson and Connecticut basins. The south-east mountain after leaving the Hudson, continues N. E.

about 30 miles, and gradually complying with the general bend of the system, leaves New York, and in the north-west angle of Connecticut, inclines to a course a little E. of N., which is perpetuated with slight inflections into Lower Canada.

In the valley between the two chains we have been designating, and interlocking sources with Hoosack and Kinderhook branches of the Hudson, and with Westfield branch of Connecticut, rises, in Berkshire county, Massachusetts, the Houssatonick. With one abrupt bend of 5 miles to the west near Stockbridge, the Houssatonick flows 70 miles down the mountain valley in which it rises; 40 in Berkshire county of Massachusetts, and 30 in Litchfield county of Connecticut. Turning to south-east, it breaks through the south-east mountain, crosses the south-west angle of Litchfield, and again separating New Haven and Fairfield counties, continues south-east 35 miles to the influx from the north of its only large tributary, the Naugatuck. The latter is a fine little stream of 40 miles in length, rising in Litchfield, and entering its recipient in New Haven county. Below its reception of the Naugatuck, the Houssatonick resumes a course of a little W. of S. 10 miles, enters Long Island sound below Stratford, after an entire comparative course of 115 miles.

The very confined, but as it has New Haven harbour for its estuary, the important basin of Wallingford, is naturally connected with that of Houssatonick only from proximity, as, though within 7 miles from New Haven, two chains of mountains separate them from each other. These minor chains rise in the immediate vicinity of New Haven, and the western stretching northwardly, either merges into the Hoosack chain or into the hills of Hamden county, Massachusetts; whilst the eastern, similar to the New England chains generally, ranges a little E. of N. over New Haven and Hartford counties, in Connecticut; and as laid down in our maps, termin-

nates at Westfield river, in Hamden county, Massachusetts. This eastern chain, speaking relatively with the preceding, is, however, though broken in our maps, continuous in nature, and rises near Hadley and Northampton, in Hampshire, and near Greenfield, in Franklin counties, to considerable mountain masses. Leaving Massachusetts, this chain inclines more eastwardly, and leaves Connecticut river, as shall be more particularly noticed in the sequel.

Out of the southern vallies of these two chains, the fountains of Quinipaug or Wallingford are derived, which, after a short course of 30 miles, unite their streams, and opening into a fine bay, of 5 miles, affords a beautiful and convenient port to New Haven. On the roads from Hew Haven to Hartford or Middletown, the traveller will find in the valley of the Wallingford a full compensation for the brevity of its extent. Here is, in a small compass, one of the best cultivated and naturally variegated tracts in the United States. The site of New Haven, an alluvial plain, is quickly followed by all the strong contrasted features of mountain and valley.

There are few, if any other streams of the Atlantic border of the United States, where relative level differs more comparatively with the length of its course than does the volume of the Houssatonick. The table land of Berkshire county, Massachusetts, must exceed 1000 feet elevation above the ocean level. This relative height produces a severity and continuance of winter in the higher valley of the Houssatonick, which is unknown on Hudson river, near Hudson city, or in the vicinity of Boston, though on the same parallel of latitude. That fine mountain valley drained by the sources of the Hoosack and Houssatonick, and occupied by Berkshire county, is amongst the most picturesque and fertile of the Alpine tracts of the United States. In its advance towards its recipient, the Houssatonick flows through

a region much more rugged than that around its sources. Litchfield county, of Connecticut, presents a congeries of mountain ridges, with rich and beautiful intervening vales, and though less broken near its efflux into the sound, the whole basin of this impetuous stream affords an interesting series of strongly contrasted landscapes.

The progress of our survey has now brought us to the long and truly interesting basin of Connecticut. Its remote sources rise at N. lat. $45^{\circ} 20'$, and in long. W. C. $5^{\circ} 30'$ E. Its entrance into the sound is at N. lat. $41^{\circ} 18'$, long. W. C. $4^{\circ} 40'$ E. By actual calculation, its entire course is from its source to efflux, S. $12^{\circ} 18'$ W. $239\frac{1}{2}$ geographical and $276\frac{1}{2}$ English miles. Measured by steps of 50 miles along its valley, it falls a small fraction short of 300 miles. Above the mouth of the Passumpsick, the basin is about 90 by 30 miles, but below the latter confluent widens to about 40 miles, which remains nearly its mean breadth to Long Island sound, 210 miles. From these elements, the Connecticut basin, above Passumpsic, has an area of 900 square miles, and below, 8400; having an aggregate superficies of 9300 square miles.

As far as our maps can be depended on, the Connecticut has interlocking sources with the higher branches of Androscoggin, Kennebec, Chaudiere, and St. Francis rivers. Flowing about 50 miles a little W. of S., to Lancaster, in Coos county, New Hampshire, it turns to south-west 25 miles to its passage through one of the Appalachian ridges, receives the Passumpsick from the north, and is precipitated over Barnet falls.

Though much smaller and more contracted in its length of course, the Passumpsick, rises in and drains the continuation of the great basin of the Connecticut, giving to the larger streams, in a physical point of view, the appearance of a branch. The *Passumpsick* rises in and drains Caledonia county.

Vermont, heading with La Moelle river flowing into Lake Champlain, and with some confluent of Connecticut river, and Lake Memphramagog ; general course a little W. of S. 30 miles.

Below the Passumpsick, the Connecticut river turns to a little W. of S., which course it maintains about 140 miles, where it is turned to south-east by a mountain ridge, and in the south-western part of Cheshire county, New Hampshire, and the south-eastern of Windham county, Vermont, receives the Ashuelot from the former. Five miles below the influx of the Ashuelot, the Connecticut, having assumed a southern course, enters Massachusetts, and 10 miles farther receives Miller's river from the east. Below the entrance of Miller's river, the Connecticut abruptly bends to the west, five miles to Greenfield, and again assuming a southern course three miles below the latter village receives Deerfield river from the north-west. Though partially inflected by the mountain chain in the vicinity of Northampton and Hadley, the course of Connecticut from Greenfield in Massachusetts, to Middletown in Connecticut, is in a distance of 60 miles nearly due south.

At Middletown this fine stream is once more inflected by a mountain chain, and bends to south-east, in which direction it continues 25 miles to its influx into Long Island sound. The confluent of the Connecticut, though beautiful mountain streams, are comparatively humble as to magnitude or length of course. Of those already named, none exceed 40 miles, and the Chickapee from the north-east, and Westfield from the north-west, entering in the southern part of Massachusetts, each falls short even of that length. Farmington river is the largest and most important branch of Connecticut. The former rises in Hampden county, Massachusetts, flows S. S. E. 15 miles, enters the south-east angle of Litchfield county, Connecticut, and continuing its

primitive course 25 miles, passes one chain of mountains, enters Farmington valley, and is arrested by the Farmington chain at the village of Farmington. Here the stream turns by an acute angle, to a course of a little E. of N., which it pursues 12 miles along the mountain foot, and again abruptly bends to the east, pierces the mountain, and inflecting to south-east, enters Connecticut river below Windsor after a comparative course of 60 miles.

An artificial chain of canal intercommunication has been projected along the Farmington, and in part recently effected.

Below the Farmington, Connecticut receives no tributary worthy notice, and similar to the Hudson its general width is but little influenced by the tides, which flow above Hartford. It is a common mistake to suppose the Hudson to be the only river of the Atlantic slope of the United States, which admits the ocean tides over or into the primitive range. The Hudson is, in reality, the only channel in which the tides actually traverse the primitive, but the Connecticut also receives the ocean swell above Hartford, and of course, over the exterior primitive; as that formation constitutes the solid shores of Long Island sound.

In the map, inserted in Maclure's Geology of the United States, an elliptical section of Old Red Sandstone, is delineated as commencing at the head of New Haven harbour, and lying in a position from S. S. W. by S. to N. N. E. by E., and extending up Connecticut basin to the northern boundary of Massachusetts, and with the primitive granite formation on each side. In this map Connecticut river is made to leave the Red Sandstone, and enter on the primitive by the mountain pass below Middletown. But on a geological map, drawn by the Rev. Edward Hitchcock, and published in Silliman's Journal of Science, which represents the country from New Haven to Bellow's Falls, the intermediate space including the Connecticut river from its mouth to the termi-

nation of the map, the red sand-stone is not even sketched as the prevailing rock. With little apparent regularity we have marked, on the latter map, primitive limestone, primitive greenstone, hornblende-slate, mica-slate, Talcose-slate, chlorite-slate, sienite, argillite, limestone, verd antique, secondary-greenstone, coal formation, and alluvion; and to border this mixture of formations, granite and gneiss.

If the latter map is even an approach towards accuracy, it demonstrates how very little either the chains of mountains or rivers are influenced by that vague system of arrangement called formation. In reality, to an eye at all acquainted with surveying the earth's surface, the delineations on either map must be doubtful. To measure and project with tolerable correctness, the complex formations on the latter noticed map, would demand an expenditure of time, talent, and money, which has never been made to collect such data from any section of the United States. There is a general approach in the Appalachian system of mountains to a regularity of arrangement; but the component materials evince no such definite organization.

In its ordinary features, the Connecticut has considerable resemblance to the Susquehanna. Flowing in a deep and in most places a narrow valley, bordered by mountains or very elevated hills, both rivers present along their margins extended alluvial flats. On the former river the alluvial tracts present some highly interesting traits. This species of soil commences above the mountain pass near Middletown, and opposite that village spreads into a circular plain, limited backwards from the river by the mountain chain of hornblende slate.* Five miles above Middletown the elevated formations reach the river on both banks, but again recede in about three miles, and another immense alluvial plain

* Hitchcock's map.

spreads along both banks, and, with unequal width, stretches upwards of forty miles, varying in width, from Wetherfield and Glastonbury in Connecticut, to South Hadley in Massachusetts. At the latter place the Connecticut river is traversed by the Farmington chain, which approaching the stream in rock masses, interrupts the alluvion for about three miles. Here, if Hitchcock's map is correct, occurs a singular exemplification of the geological structure of Connecticut basin. That geologist traces a series of the secondary greenstone, with a short interruption in Wallingford and Meriden, from the vicinity of New Haven, and as forming the western side of Farmington mountain, carries it over the Connecticut river between South Hadley and East Hampton. The eastern slope of the mountain is, according to Mr. Hitchcock, composed of the coal formation series.

It may be remembered that I have already noticed the very angular bend of Farmington river, in Farmington valley, and from Mr. Hitchcock's map, and no doubt from the real face of nature, the apparent continuation of that stream would have been along the west foot of the mountain into Connecticut river, at the southern base of Mount Tom, carrying Westfield river with it ; but from local and not easily traced impediments, both streams pierce the mountain chain, and quit the valley which nature seems to have destined as their course, and enter their recipient, if the expression may be pardoned, by anomalous channels. In fact, if Farmington and Westfield rivers had followed the mountain valley, and joined the Connecticut in East Hampton, they would have, with Manhan river, afforded a truly astonishing resemblance to the real relative courses of the Wallkill, Rendoutkill, and Esopus rivers in New York. I would strongly recommend those who may desire to possess a critical knowledge of the *geography of the United States*, to compare the minute

features of the two regions I have noticed. A few moments thus applied will be most richly rewarded. Such scrutiny would lead to the discovery, that the alluvial tract on which New Haven has been built, is only (if it is so) interrupted in Woodbridge, to the north of which town it again opens between the two mountain chains of New Haven county, extends along the Farmington, crosses Westfield river, and reaches Connecticut at the mouth of Manhan river in West Hampton. Narrowed and chequered by the Alpine scenery of Northampton and Hadley, the alluvial valley would be found continued up Connecticut river to Greenfield, and what might well excite surprise and interest, would be the fact that its northern termination, similar to its commencement, would be perceived separated by mountain masses from Connecticut river. It would appear evident from comparing the mountain and river vallies, that this great alluvial deposit of 90 miles in length lies in one of the former, and that neither its extent or range has been principally produced by the existing rivers, or at least by rivers flowing at their present level.

We may close this part of our survey by observing, that I might have correctly subdivided the Connecticut basin into sub-basins in the same manner as I had done with that of the Hudson; but though the former basin would admit such subdivision as well as the latter, the lines of separation are not in each case equally obvious, nor in fact is the entire space drained by the Connecticut equally well delineated on our maps, as is that of the Hudson basin. It is true, however, that that part of Connecticut basin from Bellows Falls to the mountain pass below Middletown, has a striking general resemblance to the central sub-basin of the Hudson, except in the single circumstance of extent. In both, the ocean tides pass over the primitive into a secondary formation, and in both the mountain and river vallies intersect with an intricacy which demands close and long conti-

nued observation to clearly understand their respective extent and position.

We have seen that the basin of Connecticut is in great part based on primitive rock, and though passing one small ridge of mountains near Middletown, it is nevertheless navigable for vessels drawing ten feet water, to the latter place, above the mountain pass, or 36 miles, following the windings of the stream from Long Island sound. Vessels of seven and a half feet ascend to Hartford, fifteen miles above Middletown. The latter place is at the head of sea navigation, and near the head of the tides ; but, though considerably obstructed by falls, rapids, and shoals, the navigation of this river has been so much improved, by dams, locks, and short canals, as to admit boats of considerable tonnage to ascend to, and descend from, Haverhill, Coos county, New Hampshire, and even to and from the Fifteen Mile Falls above Haverhill, upwards of 250 miles, following the particular bends of the river above its mouth. This is very considerably the deepest ascending navigation on the Atlantic slope of the United States east from the Hudson.

Though flowing in a general course without any great inflections, yet by its meanders, it is probable that the Connecticut would exceed four hundred miles.

There remains one more point of comparison between the Hudson and Connecticut basins which ought not to be omitted ; that is, the parallelism of the two streams. It is about sixty miles from the mouth of Onion river into Lake Champlain, to Connecticut river at the influx of Passumpsick, and following the two great vallies southward 180 miles, the relative distance does not vary more than ten or twelve miles ; and the declination of each from the meridian is a small angle to N. E. and S. W. in accordance with the range of the Appalachian system, eastward from the Delaware. Another feature in

the physical geography of this part of the United States deserves notice. If we turn to a map of that part of the Atlantic coast from Buzzard's to Casco bay, with the exception of Capes Cod and Ann, the general range of the coast is nearly the same with that of Hudson and Connecticut rivers, and distant from the latter stream from eighty to one hundred miles.

In respect to climate, the contrasts are strong on Connecticut basin, arising from rapid change of latitude and elevation. Though no part of the Appalachian system either included within or rising contiguous to Connecticut basin, is of great elevation, the general rise of the slope is considerable. The northern part of Coos county, New Hampshire, is, it is probable, more than 1200 feet above Long Island sound. The difference of latitude is within a small fraction of four degrees; and the difference of elevation 1200 feet, equivalent to three degrees, would give an aggregate extreme of temperature of seven degrees, if reduced to ocean level.

The scenery and improvements on this fine basin render it in a high degree worthy attention from the traveller and philosopher. The whole distance from the source to mouth affords a series of landscapes richly contrasted. Though less rugged than the physiognomy of Susquehanna, or perhaps that of the Hudson, there are few of those great objects of nature, river, mountain, cataract, or vallies, of all forms, but of which the Connecticut affords truly elegant specimens. But, whatever may be said of natural scenery, its claims to me were ever only felt in connexion with the productions of human labour, and the endowments of the human mind. I have travelled over a part of the noble region, I am now faintly attempting to delineate, and have realized there, the mingled sensations produced by the *splendid form in which nature appears*, at once decked *in physical and moral ornaments*.

We have now passed over that part of the Atlantic slope on which distinct chains of the Appalachian system have been traced on our maps. Beyond the Connecticut basin, the mountains are drawn in groups, but for reasons already given, I am induced to doubt the existence of mountain groups in the United States, and, strictly speaking, I doubt the existence of such a phenomenon on earth. It has been shown, under the general view of the Appalachian system, that innumerable instances the core of the chains was perpetuated evidently under the earth as well as water, and that what is called a gap, is an elevated notch in the mountain, and that where rivers pass mountain chains, the openings are only gaps depressed below the stream.

Upon these principles, combining the mechanism of the rivers of Rhode Island, Massachusetts, New Hampshire, and Maine, with that of those of Lower Canada and New Brunswick, at the risk of being thought too systematic, I shall endeavour to show the continuation of the Appalachian structure far beyond where the representation of that system is usually terminated. I am, however, compelled to proceed on much less certain grounds than has been trodden over the more south-westerly basins, and defective theory may be substituted in place of facts; but if even an unfounded hypothesis leads to more careful research, and, consequently, to more correct discovery, the temerity of hazarding a pre-disposing conjecture may be overlooked or pardoned for its ultimate utility.

The eastern part of Connecticut, and a small section of southern Massachusetts and western Rhode Island, are occupied by the two small but important basins of Thames and Paucatuck.

The Thames is formed by two unequal branches, the Quinnebaug and Shetucket. The north-eastern branch of the Quinnebaug rises in Worcester county, Massachusetts, at N. lat. $42^{\circ} 14'$, and long. W. C.

3° 05' E., and flowing thence nearly due south 16 miles, enters Windham county, Connecticut, within which, 6 miles farther, it reunites with the north-western arm from Hampden county, Massachusetts. Below their junction the united streams flow a little west of south, over Windham and into New London county 30 miles, to the influx of the Shetucket from the north-west. The latter rises nearly on the line between Hampden county, Massachusetts, and Tolland county, Connecticut, and flowing 15 miles to the centre of the latter, turns to south-east 10 miles into Windham county, where it receives a large branch, the Willamantic, from the north, and pursuing the latter course 12 miles farther, enters New London county and joins the Quinnebaug. The river now assuming the name of Thames, flows by a course a little west of south, 20 miles, into Long Island sound, at N. lat. 40° 29', long. W. C. 4° 55' E.

The basin of Paucatuck deserves notice only as the stream forms part of the boundary between Connecticut and Rhode Island, and as containing the seaport of Stonington, on a small bay at its mouth, and as forming the utmost northeastern extension of Long Island sound.

As a navigable channel the Thames ranks above the apparent size of the stream or extent drained. The tide ascends to the mouth of the Yantic, at Chelsea landing, the port of Norwich, 15 miles above the mouth. The Yantic, a small branch from the north-west, about 5 miles below the junction of Quinnebaug and Shetucket, gains importance from having the main body of Norwich upon its banks, and from being precipitated over an extensive fall at the head of tide water, between Norwich and Chelsea landing.

Norwich, though a fine and prosperous village, or rather township, does not form, when taken with Chelsea landing, the main seaport on the Thames; that rank is due to New London, on the west-

ern or right bank, a little more than 3 miles from Long Island sound. The mouth of the Thames has one defect as a navigable entrance, it is deficient in width; and, therefore, in case of war easily blockaded, and in storms of difficult approach.

The scenery on the Thames, though less bold than along the Connecticut, is yet varied and highly pleasing; particularly towards the head of tide water. In addition to the beautiful swelling environs of New Haven and Fort Griswold, those places afford to the traveller historical recollections at once melancholy and consoling.

With the Paucatuck our survey quits Long Island sound, and leads us into the interesting Narraganset bay. It has been made a question whether either the bay of Naples, the harbours of New York or Constantinople, or indeed any other bay of the world combines more varied or more attractive natural beauties than does the Narraganset. It opens, by three channels, from the Atlantic ocean, between Point Judith, on the west, and Seconet, on the east. Differing in width from 13 miles to less than 200 yards, at Providence, where it terminates. Chequered by Rhode Island, Connanicut, Prudence, and many smaller islands, and by shores rising by gentle acclivities, indented by bays and promontories, the Narraganset extends in a northern direction 30 miles. It is the estuary of Pawtucket, Taunton, and Pautuxet rivers.

The main stream which enters this bay, and mingling with it near its head, may be considered as its continuation, is Pawtucket. This river rises in the mountain tract on each side of Worcester, in Worcester county, Massachusetts, interlocking sources with Chickapee branch of Connecticut, with Nashua and Concord branches of Merrimac, and with the Quinnebaug. The general course of the Pawtucket is to the south-east 35 miles; 20 in Massachusetts and 15 in Rhode Island. It is pre-

cipitated over a ledge of primitive rock and meets the tide about 4 miles to the north-east from Providence, and enters Narraganset bay, in the vicinity and below the harbour of that city.

Taunton river rises, by numerous branches, in Norfolk, Plymouth, and Bristol counties, Massachusetts. Uniting in the latter county between Dighton and Taunton, and assuming the name of the latter, flows by a general course south-west about 25 miles, opens into a small bay, which itself again opens, by two channels formed by the north-east cape of Rhode Island, into the Narraganset. The mouth of Taunton is a little within Massachusetts, but the bay into which it dilates is in Rhode Island, and locally named Bristol bay, from the town of that name near its western outlet. In this stream the tide rises to Dighton, 8 miles above its mouth.

Pautuxet is a small creek of about twenty miles general course, and rising in Providence and Kent counties, Rhode Island, flows easterly into the Narraganset, which it enters 6 miles below the city of Providence, at the flourishing village from which it has taken or to which it has given name.

It is their falls near their common recipient from which is derived to either of the confluents of Narraganset bay, a specific notice in our view; but with those falls the city of Providence has become a focus of immense manufacturing establishments.

Narraganset, as I have already noticed, has three outlets to the ocean, formed by the two islands Conanicut and Rhode Island with the projecting shores of the Continent. The two outer channels are shallow, but the middle entrance between the two islands has sufficient depth of water for vessels of the largest class. Newport, standing on a small bay of Rhode Island, and land-locked by Conanicut, is one of the best harbours on the Atlantic coast of the United States. From Newport to Providence

the channel gradually shallows, and at the latter city only light merchant vessels are admitted.

The basin of Narraganset embraces an inclined plain, the superior verge of which reaches to within 12 miles from the shore of Cape Cod bay and Boston harbour, the heads of Taunton river leaving only a long narrow slip between their fountains and the Atlantic water.

As a commercial entrance, the bay of Narraganset possesses some appropriate advantages. Receiving no large tributary river, the depth of water cannot be affected rapidly by alluvial deposit, a deterioration so common and so ruinous where havens are washed by large rivers. The peculiar local features of Newport harbour protect it also from the oceanic deposits, and give to that place a security of permanent navigable facility, which in the revolutions of physical geography and of relative political importance may be of the utmost consequence to the United States. The time may also arrive when the many natural beauties of Narraganset bay will meet from the traveller and philosopher that attention which they so deservedly claim.

That part of the Atlantic slope included in the great central bay is closed to the north-east by Barnstable peninsula, and by Martha's vineyard and Nantucket islands. Buzzard's and Cape Cod bays approach within 5 miles of each other. The former is a deep triangular indenting, stretching north-east from Narraganset bay, bounded north-west by Bristol and Plymouth counties, and south-east by Elizabeth islands and the south-west projection of Barnstable county. Buzzard's bay is entirely within Massachusetts; it receives no river or creek of consequence, but is very much indented by small bays on both shores, on one of which, at the mouth of Acushnet creek, stands the entrepot of this bay, *New Bedford*.

From a line drawn from Seconet point to the southwestern of the Elizabeth islands, to its head, Buzzard's bay measures 35 miles, lessening in width from 10 to 1 mile. This is one of the natural channels from which a canal has been projected into Cape Cod bay, in order to complete a part of a chain of inland navigation along the Atlantic coast of the United States; but the shallowness of Buzzard's bay near its head, opposes a great impediment to such an enterprise. Vessels, however, of considerable draught ascend to New Bedford, 16 or 17 miles within the capes of Buzzard's bay.

Including the two islands of Martha's Vineyard and Nantucket, the basin of Buzzard's bay stretches from south-east to north-west, about 60 miles, with a mean width of 25 miles.

CHAPTER VI.

GEOGRAPHICAL VIEW OF THE NORTH-EASTERN
SECTION OF THE ATLANTIC SLOPE, FROM
BARNSTABLE ISTHMUS TO THE MOUTH OF
ST. LAWRENCE.

IF an attentive comparison is made between the conformation of the extremes of the central bay of the Atlantic slope of the United States, their strong resemblance becomes apparent. The long westerly sweep of coast, which precedes, and the rapid bend to the northward, with the salient projection of Cape Hatteras, I have noticed. On each direction from Cape Cod, or more accurately Barnstable peninsula, the Atlantic ocean extends with very similar inflexion from the meridian, as we have found from Cape Hatteras. This comparative estimate is not intended merely to include the Capes of Hatteras and Cod, but the general extension of the continent in their vicinity. The capes are simply terms to designate salient points. By reference to a former part of this view, page —, it will be found that the Atlantic coast, from the estuary of the Alatomaha to Cape Hatteras, is noticed as stretching almost exactly parallel to the adjacent part of the Appalachian system; and to the northward of Cape Hatteras, similar to the rivers, the Atlantic is found to bend at nearly right angles to the mountain nucleus. In brief, throughout this survey, we have shewn that the courses of the ocean shores and of the rivers were decidedly influenced by the interior structure of the continent. These remarks are again fully exemplified in Cape Cod and the adjacent ocean borders.

That peninsula usually called Cape Cod, is a point of land stretching from the main continent of Massachusetts, a little north of east, 35 miles, varying in width from 6 to 20 miles. Extending along about N. lat. $41^{\circ} 40'$ to long. W. C. $7^{\circ} 08' E$. Turning at very nearly a right angle, this peninsula again extends about 30 miles, with a mean width of from two to three miles. In all its curve of 65 miles, from its union with the continent at Sandwich, to its final termination by Cape Cod, the peninsula very gradually lessens in width. The superficies of this tract is generally sand, with a level surface, but the relative position, and geographic bearing of its parts, support the opinion, that the base is a section of that great whole so deeply marked on the Atlantic slope of the United States.

In the progress of our survey from Cape Florida, we have followed the Appalachian system in its immense stretch from south-west to north-east; we have traced it to where, in the basins of the Hudson and Delaware, it curves to the north, and we are now to find that system inclining to the west of north. Passing Barnstable peninsula, and entering on an examination of the great north-eastern bay of the United States, and of the adjacent continent, a change of relative bearing of the coast and rivers is at once perceptible. Although not so delineated on our maps, I must risk the conjecture that the ranges of mountain chains, north-east from the basin of Connecticut, lie inclining from the meridians by a small angle to the west of north, and east of south, or else they reassume their original position south-west from Pennsylvania. The courses of the rivers, including that of the St. Lawrence, sustain such hypothesis. But the subject will be better illustrated in the sequel.

Enclosed by the curve of Barnstable peninsula, the extension of Cape Ann, and the intervening coast of Massachusetts, spreads a gulf or bay in the

form of a parallelogram of 55 miles in length, from S. S. E. to N. N. W., and 25 miles in width. Taken in its utmost extent, this sheet of water has been appropriately called the bay of Massachusetts, and in its indentings, besides others of less note, has the fine harbours of Plymouth, Boston, and Salem. From Cape Cod to Cape Ann, it is open 44 miles to the Atlantic. It is not a little curious to observe how greatly the minute points along the coast of Massachusetts bay develop the physical structure of that part of the earth. Plymouth Point, and Gurnet Point, which form Plymouth Harbour; Point Alderton and Point Shirley, which form the extremes of Boston bay; and Great Nahant beach, extend with a mutual parallelism, which approaches the regularity of artificial arrangement; and what enhances the interest of such phenomena, is the circumstance, that this parallelism is in accordance with the longitudinal extension of Massachusetts bay itself, and is either with, or very nearly at right angles to the courses of the rivers. We may justly conclude that the northern arm of Barnstable peninsula, and Gurnet, Plymouth, Alderton, Shirley, and Nahant points are formed by sand or giest resting upon rocks in *situ*, and that these rocks form minor parts of that vast system of physical arrangement, of which the Appalachian mass is the mighty nucleus.

From the structure of the interior country, Massachusetts bay receives no river of thirty miles comparative course, and but one, Charles river, which derives its sources above twelve miles inland. A narrow inclined plain curves round the bay from Cape Cod to Cape Ann, 150 miles, and differing in width from half a mile to 15 miles, though the mean width does not exceed, if it amounts to 8 miles; area 1200 square miles.

From some cause, or perhaps from a combination of causes, Barnstable peninsula forms a remarkable

point of change in the elevation of the Atlantic tides. Proceeding south-west from that peninsula, the tides become more and more moderate, until within Cuba straits the ocean swell does not exceed a mean of three feet; but, on the contrary, north-east from Cape Cod, or more correctly, from the southern part of Massachusetts bay, a sudden and excessive augmentation takes place. In Buzzard's bay the tide does not at a mean exceed four and a half feet, whilst at a distance of 7 miles, over Sandwich neck, the swell amounts to 17 or 18 feet, and goes on increasing north-eastwardly along the shores of North-east bay, until, in its utmost extension, the Bay of Fundy, the ocean pours upon the coast with the enormous weight of from 50 to 60 feet. These very high tides produce effects which give to the natural history of this bay of the Atlantic, peculiar features. Without a knowledge of this circumstance in the motion and quantity of the tides, it would excite astonishment or incredulity, to be informed that the harbours of Plymouth, Boston, Salem, Newburyport, Portsmouth, Portland, and still more, the harbours farther north-east, were less obstructed with ice in winter, than even the port of New York. But the difficulty is at once solved by an attention to the natural effects of the ebb and flow of such accumulated masses of water, and particularly in the ebb, which bears with irresistible impetuosity into the ocean, the fragments of ice formed by the previous flow.


The obvious consequence of the preceding phenomena is, that the Atlantic is more and longer navigable, upon an equal descent of coast, to the north-east, than to the south-west of Barnstable peninsula; but from the much more rapid acclivity of the continent in the former, than in the latter section of the United States, the advantage of superior elevation of tide water is fully, if not more than compensated. We have seen already that in Chesapeake bay,

Delaware bay, and Hudson, and in particular the latter channel, the tides, though of moderate height, penetrate deeply into the continent; but north-east from Barnstable peninsula, there is no tide channel of 60 miles depth from the open ocean.

I have seen no satisfactory explanation of the cause of the great extremes of tide elevation on the Atlantic coast of the United States and New Brunswick, and would ask if the phenomenon is not explicable from the physical features of the Gulf Stream? In the notice of that ocean river in the first chapter of this *View*, it has been, I hope, demonstrated, that its height above the contiguous ocean, and the intensity of its current, must decrease from the Bahama channel to about N. lat. 50°; and we may now lay down as a postulate that in proportion as the Gulf Stream depresses in height, and moderates in rapidity of flow, the oceanic swell would meet with decreasing impediment in its westerly course towards the American coast; and consequently the result, excessive tides to the north-east. The projection of Barnstable peninsula, which operates as an immense dike, serves as a demarcation, and in part produces the sudden revolution in the tide level which we have noticed. But to return to our subject.

So very rapid is the acclivity around Massachusetts bay, that, with the increase of 9 or 10 feet to the tides, the ocean swell is every where arrested within three or four miles from the coast, except in the case of Charles river, in which the tide flows to Dedham. Here I may again repeat the observation made when treating on Narraganset bay, that the harbours of Massachusetts bay possess a similar advantage in an exemption from alluvial deposit.

The importance of a bay having on its shores Plymouth, Boston, and Salem, with numerous other harbours of less note, will warrant some amplification in this place. Being detached as we have seen



from the interior country by the rapid inclination of its shores, the inhabitants on Massachusetts bay, have long since turned their attention to the formation of artificial channels, one of which, the Middlesex canal, has been effected, though very imperfectly constructed. This canal, 27 miles long, leaves the Merrimac river above its lower falls, and terminates at Charlestown, opposite Boston. The water in the canal is 30 feet wide at the surface, 20 at the bottom, and three feet deep. Concord river crosses the line of the canal on the summit-level, 22 miles from Charlestown, and five from the junction of the canal with the Merrimac, and thus more than an ample supply of water is afforded for lockage in both directions. From Boston harbour to the summit-level, is 104 feet, and from thence to the Merrimac is a descent of 32 feet. The entire rise and fall is 136 feet, and serves to illustrate the inflections of surface. In a direct line, it is only 16 miles from Boston harbour to the summit-level, rising 104 feet, or at a mean of $6\frac{1}{2}$ feet per mile. If we suppose, as we may do reasonably, that the tides in the harbour of Boston, and in the mouth of the Merrimac, are level with each other, we then find that the Merrimac channel rises 104 less 32 or 74 feet in the intermediate space from the Atlantic ocean to Chelmsford, in a distance, following the stream, of about 35, but in a direct line only 26 miles.

This, called the Middlesex canal, from the country through which it has been formed, is of so much utility, and has been so very imperfectly executed, that in the advance of improvement, it is probable it will be entirely re-constructed. It is rapidly becoming a maxim in canal and road architecture, *to undertake neither, until their practicability and benefits are made manifest; but when once undertaken, to be only formed from and based on permanent materials.*

Middlesex canal opens to Boston, the commerce

of the Merrimac basin, the position and extent of which will soon be shown.

Canals have been projected to unite Massachusetts bay and Buzzard's bay, and surveys and levels taken from Back river of the latter, and Scussett's river of the former; distance found, 7 miles, and summit level 40 feet above low water mark, in Buzzard's bay. Tide in Massachusetts bay, 18, and in Buzzard's, $3\frac{1}{2}$ feet.

Another survey was made from Barnstable, in Massachusetts, to Hyannus harbour, and here similar obstacles were discovered as had been found between Buzzard's bay and Scussett's river. Hyannus, like the head of Buzzard's bay, is incommoded with shoals, and has only a tide of 4 feet. In Barnstable bay the tides are 16 feet. Summit level, 80 feet above low tide.

Another and more interior route has engaged the attention of the legislature of Massachusetts, and that is, to unite Weymouth landing, in Boston harbour, with Taunton river, which we have already described as entering into Narraganset bay. Two routes have been examined, and one found 26, the other $23\frac{1}{2}$ miles. Intermediate summit level 133 feet, but by digging 10 feet for the space of one mile, may be reduced to 123. The facility of obtaining a sufficient supply of water on the summit level has not yet been very satisfactorily determined. If practicable, a single glance on a map of the United States will exhibit the immense addition such a canal would be to the internal navigation of the United States.

Passing Cape Ann, the coast again curves into a deep bay, which at its greatest sweep receives Merrimac river at Newburyport.

The Merrimac is formed by the Merrimac proper, and the Nashua, and Concord rivers. The Merrimac rises in the highest mountain nucleus of the United States, north-east from the Hudson, and

interlocking sources with the Amanoosuck branch of Connecticut, and those of Saco. The general course of the Merrimac, from its source to its junction with the outlet of Winnepisseogee lake, from the north-east, is very nearly due south, 50 miles. It thence inclines to S. S. E. 12 miles, and receives from the south-west the Contocook. Continuing the latter course about 40 miles, it is augmented by the Nashua from S. S. W. Below the mouth of Nashua the Merrimac, in a distance of 12 miles, gradually curves to the east, and falls over a ledge of rocks below Chelmsford. At the foot of the Chelmsford falls, the Concord enters from the S. S. W., and the Merrimac turns to N. E. 30 miles, to the Atlantic ocean.

The difference of level in the extremes of this basin, independent of the peaks of the White Mountains of New Hampshire, 7300 feet, is very considerable. With it commences that admixture of lake and mountain scenery, so characteristic of the north-eastern section of the United States. The lake physiognomy, however, is not confined to that section alone; but, on the contrary, is an elongation into Maine and New Hampshire of that great feature which is perceived on leaving the basin of Mississippi to arrive on that of St. Lawrence. Over all the continents of both Americas, from the extreme south at Cape Horn, lakes, in the real meaning of the term, are rare, and when found, comparatively small, until the basin of the Mississippi is passed. That vast assemblage of fresh water reservoirs, which separate the United States from Canada, is only a bold frontispiece to an enormous volume, which spreads over the residue of North America, as far as known towards the northern pole. It may be observed, that if we commence a traverse of the Appalachian system at its south-western extremity, *we find no existing lakes, but advancing northwards, these minor basins appear on a very small scale in*

the Susquehanna basin, and accumulate in number, proceeding over the Hudson and Connecticut basins, but still continue diminutive. But with the Merrimac we meet, in Winnepisseogee, a sheet of water of 25 miles in length and from one to ten miles wide, and not remaining solitary, but followed in rapid succession by others of various dimensions. Indeed no known river of the continent, beyond the Merrimac, is without lakes as a part of its physical features.

As a commercial or navigable basin, the importance of the Merrimac has been much enhanced by the Middlesex canal, and other improvements made on the river itself. According to the estimates made by Mr. Sullivan, the lands within six miles from the canal, have risen one third in price; while land in the country generally retains its former value. In the state of New Hampshire, through which the Merrimac flows, timber is now worth from one to three dollars per ton standing; before the canal was made it was worth nothing; so that in the article of timber alone, that state is supposed to have been benefitted to the amount of 5,000,000 of dollars. The good land there has risen in price since the opening of the canal, from \$2 to \$6, \$8, or \$10 per acre.

If this statement is correct, it is a most valuable commentary on canal making; but the Merrimac has been improved by other works. The tide rises only to Haverhill, 18 miles. I have shewn that the surface of the river above the Chelmsford falls is 74 feet above tide water. In order to pass the falls, a canal of three locks descends 34 feet. It does not meet the tide, but though the stream is still rapid, it is navigable, and following the minute bends, falls 45 feet, and reaches the tide at Haverhill.

Above Chelmsford the Merrimac has been made navigable to Concord. The first great improvement made in the stream below the latter place is the Bow canal, constructed in 1812. Hooksett ca-

nal, 6 miles still lower, in a fall of 17 feet, passes another difficult fall or rapid. Amoskeag canal, 8 miles below that of Hooksett, affords the second most extensive body of work of a similar nature in New England. In 9 miles below Amoskeag canal, are 6 more of smaller extent, round as many falls or rapids. Cromwell's falls, also made navigable by a canal, is 14 miles below Amoskeag, and still lower is the Wicasse falls, around which is also a canal, the last above that of Middlesex.

Taken comparatively, more of labour and money have been expended on the Merrimac than upon any other river of the United States.

The small basin of Piscataqua, enclosed in the land-side by those of Merrimac and Saco, gains celebrity by containing near its efflux the fine haven of Portsmouth, in New Hampshire. This singularly constructed basin is nearly in form of a parallelogram, 40 by 25 miles, area 1000 square miles. Salmon Fall river from the N. N. W., and Conchecho from the N. W., unite about 10 miles north-west from Portsmouth, turn south, and flowing in that direction 5 miles, receives the outlet of an interior lake called Great Bay. This latter sheet of water is the estuary of Lamprey's and Exeter rivers, and extending from north to south, eight or ten miles, leaves a peninsula between it and the Atlantic ocean on which Portsmouth stands, and on the south side of the haven formed by the discharge of the waters of the basin. The name of Piscataqua has been frequently applied to Salmon Fall river, but is more correctly restricted to the tide water channel, below the mouth of Conchecho river, and particularly below the discharge of Great Bay.

As a navigable basin, except near its mouth, the Piscataqua is unimportant. The acclivity of the country is so rapid that the tides are arrested at a short distance inland. Portsmouth harbour itself is, however, perhaps the best haven on the Atlantic

coast of the United States; and the very high tides prevent accumulation of ice, and leave this harbour open throughout all seasons.

The basin of Saco follows that of Piscataqua, if we include in the former the small river Kennebunk. Saco is a real mountain stream, and draws its extreme sources from the summits and vallies of the White Mountains. Augmented by these Alpine snows, the Saco flows south-east 20 miles, receives Swift river from the west, and turns to north-east 18 miles. Hence the stream again suddenly bends to S. S. E., which course is maintained 50 miles to its efflux into the Atlantic ocean. So very rapid is the rise of the land, that though the tides at its mouth exceed 20 feet, they are arrested at Biddeford, 7 • miles above the ocean.

Kennebunk, on the small river Kennebunk, is the principal entrepot of the basin, and is a port of considerable consequence.

Rising from a mountain chain at an elevation of 7300 feet, Saco basin, though not attaining, yet approaches the region of perpetual snow, and if we estimate 400 feet as an equivalent to a degree of latitude, the actual difference in the basin itself, added to the allowance for relative height, would yield an extreme of temperature equal to 20 degrees of latitude.

If we multiply the square root of the height of any given mountain in feet, by 1.2247, the quotient is the distance in miles from which it can be seen upon the surface of the sphere. From this formula, White Mountain, allowing its elevation to be 7300 feet, can be seen at a distance of $104\frac{1}{2}$ miles; and consequently renders its summit visible on the Atlantic ocean from the outlet of Merrimac to Penobscot bay, and at a distance of 35 miles from the shore opposite the mouth of Saco. This is the only part of the Atlantic ocean from which the distinct ridges or chains of the Appalachian system can be seen.

The basin of Presumscot or Casco follows that of Saco. The former, though inferior in extent, is nevertheless, in a navigable point of view, of superior consequence to the latter. The higher source of Presumscot, Crooked river, rises in the spurs of the White Mountains, and near the Amarisoggin. Flowing thence south-east 30 miles falls into a large lake called Sebago pond, about 10 miles square. From the eastern side of Sebago pond the stream again issues and is known as Presumscot river, which by a curve to the southward, but by a general course of south-east 20 miles, falls into Casco bay, opposite Portland in Maine.

Casco bay is a noble sheet of water stretching from S. W. to N. E. 20 miles, with a mean width of 5 miles, land-locked by a chain of islands, and having at the south-west extremity the important harbour of Portland; but, here again the rapid acclivity of the shores arrests the tides at a few miles from the Atlantic.

The small basin of Casco is succeeded by the comparatively great basin of Kennebeck. With the outlet of the latter the direction and character of the Atlantic coast again change. Hitherto, from Florida Point we have found the coast, though much indented by bays and chequered by islands, yet, if contrasted with that part of the survey which we now commence, tolerably uniform. But from Casco to Passamaquoddy bay, long projecting peninsular points, islands of all shapes and bearing, with deep intervening bays, render the coast of Maine one of the most intricate on earth; and if not opened by excessive tides, one of the most unnavigable in winter.

The regular physical structure of the Atlantic coast of the United States receives another illustration in the coast from Casco to the head of the Bay of Fundy. It has been shewn from actual calculation that the intervening coast of the United States,

between Savannah river and Cape Hatteras, was N. $56^{\circ} 30'$ E., and *vice versa* in its bearing. Long Island we found lying in a direction N. $69^{\circ} 44'$ E., which is very nearly that of the entire coast from the mouth of the Hudson to the outer projection of Barnstable peninsula. By similar means we find that Portland in N. lat. $43^{\circ} 38'$, long. W. C. $6^{\circ} 42'$ E., and Quoddy Point in N. lat. $44^{\circ} 44'$, and long. W. C. 10° E., bear from each other N. $65^{\circ} 05'$ E., distant $181\frac{1}{2}$ English miles. The latter course if continued north-eastward will follow the Bay of Fundy to the head of Chignecto channel, and is very near parallel to the outer coast of Nova Scotia and the island of Cape Breton.

Thus it appears that where the Atlantic coast of North America, from Florida to St. Lawrence bay, inflects to the N. E. and S. W., the angles of inflection approximate towards regularity or rather uniformity of construction, which certainly evinces, if it does not demonstrate, a general and widely extended system, which, if admitted to exist, presupposes an adequate cause.

With these preliminary remarks we proceed to survey the basins of Maine eastward from that of Presumscot. Kennebec basin is bounded south by the Atlantic ocean, south-west by the basins of Presumscot and Saco, west by that of Connecticut, north-west by that of the Chaudiere, and north and east by that of Penobscot. The Kennebec basin lies in a general direction from north to south, extending from N. lat. $43^{\circ} 40'$ to $45^{\circ} 46'$, and in long. from $5^{\circ} 45'$ to $7^{\circ} 50'$ E. from W. C.

The Kennebec river is formed by two great branches; the Androscoggin and Kennebec proper. The former is the south-western branch, and rising in the same ridge with the Connecticut, at about N. lat. $45^{\circ} 12'$, flows by numerous branches 20 or 25 miles southwardly into a congeries of lakes, out of the westernmost of which, the Umbagog, the

united waters now a large stream, issues in a western direction. Turning quickly to the south, and pursuing that course 30 miles, distant from 15 to 25 miles from Connecticut, and by the name of Amarriscoggin, reaches the northern base of the main nucleus of the White Mountains. Again curving at nearly right angles, pierces the mountain chain and flows nearly due east 50 miles, where it once more bends at right angles and assumes a southern course, which is continued 30 miles to N. lat. 44°, below which, by a gradual curve of 20 miles, first south-east, thence east, and finally north-east, it unites with Kennebec above Bath, after an entire comparative course of 135 miles. Below the mountains this stream is known as the Androscoggin, and though it receives no large tributary branches, is augmented by numerous creeks, and is, for its length, a very large river, a remark, however, which may be made and applied to all the rivers of Maine.

The principal stream of the basin, the Kennebec, rises opposite the sources of the Chaudiere, and south from those of the Penobscot, and formed by an intricacy of lakes and creeks flows to the east 40 miles, and falls into Moosehead lake. This sheet of water stretching 30 miles from north to south, with a breadth from 5 to 20 miles, discharges Kennebec river from its south-western side. Flowing S. S. W. about 20 miles it receives Dead river, a considerable branch from the west, and turning to a southern course about 40 miles, bends thence 5 miles to Norridgewock. Below the latter place, the Kennebec curves to the north-east 10 miles, and thence S. S. E. 20 miles to the influx from the north-east of the Sebasticook river, and slowly assuming a course of a little W. of S. 35 miles, joins the Androscoggin after an entire comparative course of 180 miles.

The Kennebec, below the union of its two great branches, is rather a complex bay than a river. Be-

low Bath, the long narrow peninsula of Phippsburg reaches about 20 miles due south, and forms the western boundary of Kennebec bay. Eastward from that peninsula spread numerous islands and interlocking channels, which indent the coast upwards of 40 miles to Penobscot bay. In this place, the principal entrances are Sheepscut river, Damariscotta river, and St. George's river.

As a navigable basin the Kennebec is of great importance; the tide ascends Kennebec proper to Augusta 40 miles, and up the Androscoggin to near Durham, about 35 miles from the open ocean. Though both branches are obstructed by falls and shoals, they afford considerable facility to inland navigation; the principal article of down stream transportation is lumber.

Penobscot basin follows that of Kennebec, and opens to the Atlantic ocean by a wide bay 30 miles in depth. The Penobscot basin has that of Kennebec west, St. John's north, and St. Croix or Passamaquoddy east.

Geographically, Penobscot extends from the Fox islands, at the mouth of Penobscot bay, at N. lat. $43^{\circ} 53'$, to the extreme northern source of Penobscot river at N. lat. $46^{\circ} 12'$, and in long. from $6^{\circ} 36'$ to $9^{\circ} 10'$ E. of W. C. In form it has a rude resemblance to a tree, the root towards the ocean and top-spreading inland, general direction about north and south, with a large protruding branch to the north-west.

Penobscot is formed by two unequal branches, Penobscot proper, and Piscataquis. The remote north-western sources of the Penobscot reach to within 60 miles from the St. Lawrence, immediately below Quebec, and have interlocking sources with the St. John's, Kennebec, and Chaudiere. Similar to the other streams of that region, the Penobscot is formed by a congeries of lakes, and *interlocking* creeks, which flow by a general course

of S. E. 40 miles into Chesuncook lake, a sheet of water, about 15 by 5 miles. Issuing again from the south-east angle of Chesuncook lake, the Penobscot continues S. E. 45 miles, to the influx of Watawankeag river from the N. E. Below their junction the united waters turn to S. S. W. 25 miles, to the influx from the west of the Piscataquis.

The latter stream, though the principal confluent of the Penobscot, is comparatively small, having a general course not exceeding 45 miles. The Piscataquis is, however, for its brief length, a large stream, having sources spread around the east side of Moose Head lake, and extending from north to south upwards of 40 miles.

Now a spacious and wide river, the Penobscot continues its course to the Atlantic ocean a little W. of S. Thirty miles below the Piscataquis the tide is met at Bangor, and gradually widening 30 miles farther opens into an expansive bay between Castine and Belfast. Chequered and decorated with numerous islands and peninsular points, Penobscot bay finally terminates between St. George's Point and the Fox Islands. The bay and river included, the Penobscot has a course of 215 miles.

Though less extensive than the united basins of the Androscoggin and Kennebec, the Penobscot basin is more navigable; the tide rises to Bangor, 60 miles within the outer capes of the bay, nor do shoals occur immediately above the termination of the tide; a circumstance in which the Penobscot is singular amongst the great streams of the Atlantic slope of the United States. Navigation remains uninterrupted by any obstruction except the current 20 miles above Bangor, and is used for an immense lumber transportation far above the Piscataquis.

The northern sections of both the Kennebec and Penobscot basins remain uncultivated wilds; but settlements are slowly extending into those entangled

regions, and as usual in the United States, projected improvements follow discovery, and precede settlement. Upper Penobscot river, above Chesuncook lake, flows past, and within two miles from, the northern extremity of Moose Head lake. Here a canal has been proposed, which with the actual settlement of the country by a dense population will be carried into effect, and unite the Kennebec and Penobscot near their sources.

From Penobscot bay to that of Passamaquoddy, in a distance of 100 miles along the margin of the ocean, a number of small rivers form bays of more or less depth and width, the principal of which are Union river, Narraguagus river, Pleasant river, Chandler's river, Machias river, and East river.

Union river terminates in Blue Hill bay, and rising at N. lat. 45° , flows a little west of south, almost exactly parallel to the Penobscot, at from 10 to 15 miles distance. Including Union river and Blue Hill bay, the whole course is about 70 miles.

With the considerable island Mount Desert intervening, Blue Hill bay is followed to the north-east 18 miles by a much wider, and deeper opening, Frenchman's bay. No river or even large creek enters the head of the latter, which is also the case with two smaller indentings still farther eastward, Goldsboro' and Dyer's bays.

Narraguagus and Pleasant rivers flow into one vast estuary, the western extension of which is called Pidgeon Hill bay, and receives the Narraguagus; and the eastern, into which is poured Pleasant river, bears the same name with its confluent. The Narraguagus and Pleasant rivers are still more humble than Union river, neither of the former having sources 40 miles inland.

Chandler's river and its estuary Englishman's bay, between Pleasant and Machias bays, are unimportant in a general sketch.

Geographically, this small maritime slope, con-

taining the minor basins I have noticed, lies between N. lat. 44° and 45° , and between Long. W. C. $8^{\circ} 20'$, and 10° E. Length along the Atlantic ocean about 90 miles, with a mean width about 30, area 2700 square miles. As a navigable section it is remarkable for the number and convenience of its harbours, and its very varied and picturesque scenery; but it is, of all parts of the coast of Maine of equal extent on the ocean, that in which the tides penetrate the least distance inland.

Machias bay and its confluent streams deserve particular notice, as the last deep indenting of the Atlantic coast of the United States, advancing from southwest to north-east, and which are entirely within its territory. Into this basin is discharged the two Machias rivers, East Machias and West Machias. On the former stand the two maritime villages of the same name, 15 miles north from the main ocean. West Machias heads about 40 miles north-west from Machias, and interlocks with Union river, and consequently both overspread the smaller intermediate streams.

North-east from Machias bay, occurs a phenomenon on the coast of Maine, a distance of 21 miles without an opening worthy notice. This uniform shore is the outer margin of a peninsula, formed by an arm of Machias bay, and Cobscook bay, opening from the western side of Passamaquoddy bay. Quoddy head is the eastern projection of this peninsula, which would seem to demand from its position a distinctive name.

We have now reached the north-eastern limit of the United States, and merge into Passamaquoddy bay. This expanse of water gains intense interest as forming a definite boundary to the United States on the Atlantic ocean. As an object in physical geography, this bay is only a curved indenting of the greater bay of Fundy. Before, therefore, we notice the former, a general view must be given of the latter.

The peninsula of Nova Scotia is united to the continent by a long narrow isthmus. This neck is bounded on one side by the southern extension of the bay or gulf of St. Lawrence, and on the other by two triangular protrusions of the bay of Fundy. The peninsula rises like an island, and stretching from S. W. to N. E. about 300 miles, with a mean breadth of 60. Between the south-western part of Nova-Scotia and the continent, an interval of about 55 miles width, and 150 in depth, is occupied by the bay of Fundy. Its opening into the Atlantic ocean is narrowed by Manan island, lying six miles outside Quoddy point, and by a long and narrow strip of land, stretching from and nearly parallel to the opposite coast of Nova Scotia. At the north-east extremity, Fundy bay is again subdivided into two smaller bays, Chignecto and Mines. The particular bay of Passamaquoddy is, as has been observed, only a mere extension of the bay of Fundy at the outlet of St. Croix or Schoodic river.

At Quoddy point the coast turns to N. N W. and pursuing that direction 20 miles to the outlet of St. Croix. In a northerly course from Quoddy point, leaving a narrow intermediate strait between them and the continent, stretch two islands, Campo Bello and Deer Island. The latter, reaching nearly to contact with a point of New Brunswick, leaves Passamaquoddy bay nearly land locked. To assist the memory, it may be noticed, that N. lat. 45° , and long. W. C. 10° , E. intersect immediately outside of Deer Island, and 9 miles due east from the mouth of St. Croix.

Schoodic or St. Croix river is formed by two branches; the St. Croix proper, and Schoodic. St. Croix rises at N. lat. $45^{\circ} 50'$, long. W. C. $9^{\circ} 10'$ E. The sources are, however, rather a congeries of lakes than any definite stream, which curve from south to east 40 miles by the name of Grand Lake. From this inundated tract issues a stream flowing

south 25 miles, and there unites with the outlet of another series of lakes, called the Schoodic lakes. Inclining a little E. of S., the St. Croix continues its course 15 miles, below its junction with Schoodic. Here between the United States village of Milltown and the British village of St. Stephens, this river bends abruptly to the N. E. 7 miles; thence curving, first east 5 miles, and finally to the S. E. 7 or 8 miles, is lost in Passamaquoddy bay, after a comparative course of 100 miles.

The Schoodic or western branch of the St. Croix, is the drain of an inundated or swampy tract, between Penobscot and St. Croix, above N. lat. 45° , and 9° E.

This great expanse of surface we have been surveying, extends over almost as much of the habitable earth as does Great Britain in Europe, and France taken together, and extending from N. lat. $28^{\circ} 15'$ to $46^{\circ} 12'$, stretches through nearly 18 degrees of latitude. Approaching at the southern extremity so near the tropic of Cancer, the facility of vegetable production seems without assignable limit. Beside an indefinite number of smaller and less important openings, we have found about thirty entrances of great extent and depth.

When reviewing the political subdivisions, we shall have a farther opportunity to develop its future capabilities whilst describing its actual condition. In this place, in order to complete a physical view of this part of the continent of North America, I shall continue the survey to St. Lawrence gulf, and close this section of our view by an examination of the great basin of St. Lawrence.

Sixty miles a little N. of E. from the mouth of St. Croix, the great river St. Johns enters the northern side of the bay of Fundy. Geographically, the basin of St. Johns extends from N. lat. $45^{\circ} 15'$ to N. lat. 48° , and in long. from $6^{\circ} 40'$ to $11^{\circ} 40'$ E. Lying in a position from N. W. to S. E., this basin is in

form of a parallelogram, 240 miles long, and about 80 mean width; area 19,200 square miles. Independent of any artificial improvement the St. Johns is one of the most navigable of the Atlantic rivers, being much less impeded by rapids, shoals, or falls, than any other stream intervening between it and the Hudson. It is formed by two main branches; the St. Johns has its extreme fountains in the N. W. part of Maine, interlocking sources with those of the Penobscot, and Chaudiere, at N. lat. $46^{\circ} 10'$, long. $6^{\circ} 40'$ E. Flowing thence N. E. about 100 miles nearly parallel to, and about 40 miles distant from, St. Lawrence river, curves to the east and receives from the south a large branch, the Alaguash. Assuming a course of N. E. by E. of 40 miles, in which distance, 6 miles below the Alaguash, the main stream is augmented by the St. François from the north, and at the termination of this course by the still more considerable confluent, also from the north, the Matawaska.

The St. François rises between Maine and Lower Canada, about 15 miles from the St. Lawrence, between Nare and Green islands, at N. lat. $47^{\circ} 45'$, and flowing thence, about 40 miles comparative course, falls into St. Johns.

The Mattawaska is a stream deserving particular notice, as at and near its mouth extends, along St. Johns, the settlement of the same name, now a subject of negotiation between the United States and Great Britain. See the map of that section of Maine.

The Mattawaska, the northern branch of St. Johns, drains the extreme northern angle of Maine, and consequently, of the United States part of the Atlantic slope. The remote sources of this stream rise within 20 miles from the main volume of St. Lawrence, or about 30 due south from the mouth of Rimousky river, at N. lat. 48° . Flowing S. E. about 80 miles, the Mattawaska joins the St. Johns. Below their junction, the united streams flow S. S. E.

40 miles, and inflect to a little E. of S. at N. lat. 47° and pursue the latter course 80 miles. From some distance above the junction of St. Johns and Mattawaska, the main volume flows at a small distance from the eastern verge of its basin; the Ristigouche, Nipisigic, and Miramichi, all rise near the St. Johns, and flow north-eastwardly into the gulf of St. Lawrence.

The only confluent of St. Johns below the Mattawaska which deserves particular notice, is the imperfectly known Aroostook. Interlocking sources with the Penobscot, the Aroostook follows the inflections of the St. Johns, flows first 50 miles a little E. of N., and thence about an equal distance N.-E. by E., and unites with its recipient at $46^{\circ} 44' N.$

If a line is drawn along the earth's surface from the Saco river, where that stream traverses the White Mountain chain, and extended thence north-east, it will pass over a series of bends in the Androscoggin, Kennebec, Penobscot and St. Johns, which when viewed on a map appear as if constructed from a given model, and afford conclusive evidence of a uniform structure in that section of the continent, and exhibit another instance, in the absence of mountain representation, of the defects of our maps.

We have traced the St. Johns to its great curve, where in perfect accordance with the Saco, Androscoggin, Kennebec, and Penobscot, it inflects to the north-east, which course it maintains 25 miles, and again turns to nearly east 50 miles. It is now a tide water river of great width and volume, and again bending assumes nearly a southern course of 50 miles, and is lost in the bay of Fundy, after an entire comparative course of 380 miles.

As a navigable channel, the St. Johns is much superior to any other stream of the United States north-east from the Hudson. The excessive high tides, and projecting rocks near its mouth, render it diffi-

cult of entrance except between the ebb and flow. The tides rise within its channel upwards of 80 miles. The mouth between St. Johns and Castleton, is narrow, and has only 17 feet water at low tides. Over this bar the incumbent mass of waters, above fifty feet, rush with prodigious velocity and eddying violence, particularly at the flow, when the ocean swell encounters the current of the river; but within all is safety.

Differing near three degrees of latitude, and perhaps one thousand feet in elevation, the temperature of the air over this basin must present extremes equivalent to five or six degrees, and when compared with the climate of the middle states of the United States, that of St. Johns must be severe in winter. The soil has been described as greatly more fertile than found in the basins of New England generally. All concurrent testimony represent this basin as of great importance in an agricultural and commercial point of view, but in reality the greater part of its surface remains a wilderness imperfectly known.

The peninsula of Nova Scotia with the island of Cape Breton, forms the north-eastern extremity of the Atlantic slope of North America. Cape Breton, following the general direction of Nova Scotia, and only separated by a very narrow channel, may be correctly united in a general view, and so estimated, presents a body of land stretching from N. W. to S. E. about 300 with a mean width of 70; area 21,000 square miles. Of this extent it is probable Nova Scotia contains three-fourths. The inclination of the peninsula, like every other part of the Atlantic slope, is towards the Atlantic ocean. The rivers, brief as to length of course, rise near the western side and flow south-eastward into the Atlantic. To this general arrangement, St. Mary's river offers a singular exception. This stream rises near the southern side of the bay of Mines, and flows parallel to the bay of

Fundy, leaving a long narrow intervening strip from one to ten miles wide, and enters the Atlantic ocean at the S. W. angle of Nova Scotia.

Cape Breton is formed by two comparatively long peninsular points, which, extending northward and north-eastward, leave a wide intermediate bay. The convex side of the island approaches to within one mile from the north-east extremity of Nova Scotia.

The interior features of both the island and peninsula are rugged and broken, and the latter, along the Atlantic very much indented by boldly rising points and deep bays.

In delineating the features and extent of the bay of Fundy, an incidental notice was taken of the isthmus which connected Nova Scotia to New Brunswick. This irregular neck of land has the head of Fundy Bay to the S. W. and the straits of Prince Edward N. E. From the head of Mines bay to the mouth of Retcoudiac river, it is about 90 miles in length, with a mean breadth from 25 to 30. The peninsula and isthmus, with the islands of Cape Breton and Prince Edward, form the province of Nova Scotia. The island of Prince Edward stretches along the southern part of the gulf of St. Lawrence 90 miles, with a mean width of 25; area, 2250 square miles. Taken together the four natural sections of Nova Scotia contain an aggregate area of 25,500 square miles.

Between the basin of St. Johns and the gulf of St. Lawrence, and between the head of the bay of Fundy and the basin of St. Lawrence, extends a triangular slope, the rivers of which are discharged into the gulf of St. Lawrence. This slope, forming the eastern part of the province of New Brunswick, stretches from N. lat. $45^{\circ} 40'$ to N. lat. $48^{\circ} 30'$, and in long. W. C. 9° to $12^{\circ} 30' E.$ Length 220; mean breadth, 50; area, 11,000 square miles.

The eastern shores of New Brunswick, beside minor indentings, are broken by two deep gulfs, Mi-

ramichi and Chaleur bays. Into the former is discharged Miramichi river, a stream of 90 miles in length, rising interlocking sources with Shicaticoke branch of St. John, and flowing N. E. by E. enters the head of Miramichi bay, at N. lat. $47^{\circ} 10'$.

Into the much more extensive opening of Chaleur bay, is discharged Ristigouche river. This stream is formed by two branches, the Ristigouche proper and the Matapediac; the former heading near the confluence of St. Johns and the Matawaska, and the latter in a lake south from the Paps of Matane on the St. Lawrence. The two branches unite near the head of Chaleur bay, and form the north-eastern river of the Atlantic slope of North America, S. W. from the St. Lawrence.

CHAPTER VII.

GEOGRAPHICAL VIEW OF ST. LAWRENCE BASIN.

If we regard the inclination of the plane and its recipient, the St. Lawrence is one of the rivers of the Atlantic slope, differing from those already described, only in extent of surface drained; but the peculiar features of the St. Lawrence basin and the immense superficies comprised within its limits, justly entitle it to the rank of a system. Regarding this fine section of the earth therefore as a whole, we commence to review in detail the separate parts.

This great basin is naturally subdivided into three unequal parts, which may be with propriety designated upper, lower, and middle.

The higher basin, the bottom of which is occupied by Lake Superior, lies in form of a rhumb; its position north-east and south-west 300 miles, and breadth from south-east to north-west nearly equal. Area about 90,000 square miles, one third of which is contained in Lake Superior. Into this reservoir are poured upwards of fifty rivers, none of which are of much importance, except St. Louis and the *Riviere au Grand Portage*. St. Louis falls into the extreme south-western angle of Lake Superior, and is the channel of intercommunication with upper Mississippi.

Riviere au Grand Portage, enters the north-west side of Lake Superior, and by its channel the route to the northern regions of North America leaves the Canadian sea.

Though individually small, the quantity of water supplied collectively by the numerous confluent of Lake Superior must be very great, and differs ma-

terially in different seasons of the year. The whole mass, composing a large river, is precipitated through the straits and down the falls of St. Mary's. The surface of the lake is by measurement 641 feet above the Atlantic level. How much the surrounding inclined plain rises, it is difficult to determine in the present imperfect state of geographical knowledge respecting those regions. Mr. Schoolcraft estimates the rise of St. Louis river at 551 feet, and independent of particular elevation, it is probable that no great error will be superinduced by estimating the outer margin of Lake Superior basin, at 600 feet above the level of the lake itself.

The cataract or fall of St. Mary is 15 miles from the lake, at N. lat. $46^{\circ} 31'$. The river above and below the main chute has a considerable descent, and the entire fall from Lake Superior to Huron is 23 feet. The whole strait is, however, with some difficulty navigable for canoes and boats. Sail vessels of 6 feet draught ascend to the foot of the falls. Those of larger size are compelled to be stopped at Sugar island. Below the cataract the strait widens, and is divided into two channels by St. George's island. It is supposed that one or both channels might be very easily deepened so as to admit, to the fall of St. Mary, any vessel which could navigate Lake Huron.

In 1820, a cession of the soil 4 miles square was obtained by the United States from the Chippeway Indians; and, on the 17th July, 1822, a command of three hundred troops, under Col. Brady, made the commencement of a military establishment at this place.

With the slight depression of 23 feet, as I have stated, the second or middle sub basin of St. Lawrence is spread below that of Lake Superior. The middle basin extends over a quadrangular area of at least 160,000 square miles, having the three great central lakes of Michigan, Huron, and Erie as its lower vallies.

Lakes Huron and Michigan, united by a wide and short strait, lie very nearly on a general level, 618 feet above the Atlantic ocean. This must, nevertheless, be understood as applying to the lake level generally, as Michigan having a constant current towards Huron, must vary in level at its extremes, but the difference is inconsiderable.

Lake Michigan is an immense chasm, at least 900 feet deep and 270 miles long, by about 50 mean width. The confluent of both this and Huron, like those of Superior, are inconsiderable in particular, but very numerous, and when swelled by spring rains and melted snows exert a sensible influence on the relative height of their recipients.

The inclination of the planes on either side of Lake Michigan, remains undetermined to any exactness, but from the brief length of its rivers, and from the flat aspect of the country from which their sources are derived, we are warranted in considering their fall as moderate. These observations will apply with much propriety to the peninsula of Michigan, between Lakes Erie, Michigan, and Huron.

Lake Huron is an expanded triangular body of water, second in mass and extent to Lake Superior. Receiving the vast discharge of both Superior and Michigan, into its north-western angle, Huron protrudes the accumulated waters from its southern extremity. A few detached islands lie scattered over the surface of Lake Superior, and a few of still more diminutive size chequer the northern part of Michigan; but Huron is almost subdivided by a regular chain. A peninsula is projected into this lake from its south-east side, and from which, in a direction S. W. by W., and nearly parallel to the northern side of the lake, the Manatoulin islands follow entirely across the lake to about midway between the mouths of Michilimakinak and St. Mary's Straits. Between the Manatoulin group or chain

and the northern shore of the lake, extends a strait of about 200 miles in length, and with a mean width of about 30 miles, also much chequered with islands. The residue of Huron, towards the Michigan coast, sinks to an almost unfathomable depth; 900 or 1000 feet would be a moderate estimate.

The prodigious depth of the three upper Canadian lakes is a very interesting phenomenon in physical geography. Though the surface of the two lowest of the three, Michigan and Huron, is 618 feet elevated above the Atlantic surface, their bottoms are nearly, if not altogether, 300 feet below the ocean tides.

The surface of the Caspian has been determined by actual admeasurement to be 321 feet below that of the Black sea; but the Caspian is shallow, and its bottom, therefore, not greatly depressed below its surface. It is therefore probable that some parts of lakes Michigan or Huron are the deepest chasms on the continental surface of the earth. This is one of the principal causes of the high transparency of their waters, a circumstance in their natural history, which has excited the admiration of travellers ever since civilized man has traversed their bosoms.

The margin of Lake Superior in most places presents a broken, rugged, and often precipitous aspect; but descending the straits of St. Mary the harsh or bold features of the scenery soften, and in many places the shores of Huron and Michigan rise gently from the water edge; and even where rock bound, the elevations have seldom the appalling front which renders the navigation of Lake Superior so dangerous, alarming, and yet alluring to the scientific voyager.

Both depression of surface, and advance to the south, have powerful and permanent effects on the seasons. Travellers and writers are not unfrequently deceived, however, when speaking of the climate

of Canada; they overlook the immense extent of that country, and seem to regard as a spot a region sweeping over ten degrees of latitude. Canada has been extolled for the mildness and dreaded for the severity of its winters, and both the admiration and dread were just. What great similarity of temperature can be expected at Quebec, above N. lat. 47° , and at Amherstburg situated near 5° more southwardly? But this subject will be more appropriately noticed under the head of climate.

Lake Erie basin constitutes the most southern section of the middle sub-basin of St. Lawrence. This shelf, if I may use the term, is elevated $565\frac{1}{2}$ feet above the Atlantic surface, and consequently lies $52\frac{1}{2}$ feet below the level of Michigan and Huron. The stationary distances in which this depression is made are exhibited in the following table.

No. XII.—*Table of the stationary distances from Lake Huron to Lake Erie.*

	Miles.	
From Fort Gratiot, at the outlet of St. Clair river, to the mouth of the river Delude, from the United States' shore - - -		3
Upper end of Isle au Cerfe - - -	5	8
Lower do. do. - - -	2	10
Mouth of Pine river - - -	4	14
Mouth of Belle Riviere - - -	8	22
Outlet of Chenal Ecarte - - -	4	26
Outlet of Warpole channel - - -	2	28
Outlet of the Eagle channel - - -	3	31
Mouth of St. Clair river into Lake St. Clair - - -	4	35
Mouth of Huron river, from U. S. shore - - -	7	42
Head of Detroit river - - -	19	61
City of DETROIT - - -	7	68
Sandwich in Canada - - -	1½	69
River Rouge, United States' shore - - -	2	71
Upper end of Grand Turkey island - - -	1	72
Mouth of the Rivier Ecorce - - -	3	75
Upper end of Gros Isle, United States' shore - - -	2	77
Lower end of Grand Turkey island - - -	2	79
Riviere aux Canards - - -	1	80
Amherstsbuurg or Malden, Canada - - -	3½	83½
Upper end of Bois Blanc - - -	½	83½
Lower ends of Bois Blanc and Gros Isles - - -	1½	85
Opposite Brown's creek, U. S. shore - - -	1	86
Lower extremity of Celeron island - - -	1	87
Mouth of Huron river, U. S. shore, and Lake Erie - - -	2	89

A fall of 52½ feet in 89 miles, demands 58 hundredths to each mile. But though thus depressed below the higher part of the basin, Lake Erie is as remarkable for its comparative shallowness, as are Superior, Huron, and Michigan, for their great depth. With the confluent of Erie, the basin of St. Law-

rence has attained its utmost southern latitude, and now assumes its great north-eastern course, with a conformity to the bearing of the opposing Atlantic coast which could never have arisen from accident.

Lake Erie is 230 miles long from S. W. to N. E. The form elliptical but much elongated, the breadth but little exceeding 50 at the widest, and not averaging more than 35 miles. The bottom of Lake Erie appears to be composed of an alluvial deposit of sand and mud, resting on an immense secondary schistose sandstone. Depth seldom exceeding 200 feet, and in few places so much. The great depth indeed of the upper lakes seems to terminate at the outlet of Huron. Assuming the name of St. Clair's river, the vast discharge of Huron issues by a rapid current of 35 miles, but moderately deep, to Lake St. Clair. The latter is a circular sheet of water of about 20 miles diameter, and very shallow, admitting only vessels of moderate size. Issuing again from the south-west angle of Lake St. Clair, the now enormous body of water rolls down a wide strait of 28 miles, called by an admixture of French and English *Detroit river*. This term as it stands is really very appropriate, as the stream between St. Clair and Erie lakes does in fact partake of the two characters of strait and river, and may be with great propriety designated the *Strait river*. Critically speaking, however, the straits of St. Mary's, Michilimakinak, St. Clair, Detroit, Niagara, and the whole St. Lawrence, below Lake Ontario, are all straits, differing only in length and quantity of water.

Detroit river, like St. Clair, is generally shallow, and only admits vessels of 7 or 8 feet draught. Compared with its great extent of coast, and the numerous streams poured into the western and south-western shores of Erie, that lake is a very *unnavigable* sheet of water; no one of its rivers, except *Detroit*, admitting vessels of 8 feet draught.

^{A c} a minor basin, the particular valley of Erie

exhibits peculiar features. If we turn to a map of that part of the St. Lawrence basin, we behold a long triangular peninsula, protruded from the country north from Lake Ontario, and extending south-west, having Lakes Huron and St. Clair, with their connecting strait and Detroit river north-west, and Lakes Ontario and Erie with Niagara river south-east. The salient point of this peninsula is that part of Upper Canada opposite the city of Detroit, and upon it, about 120 miles north-east from that city, a river rises, which flowing south-west enters Lake St. Clair, under the name of Thames. The course of this stream is very nearly parallel to Lake Erie, leaving an intermediate strip of land, upwards of 100 miles in length, and about 30 wide. The position of the Thames valley is therefore such, that more than two-thirds of the northern shore of Erie receives no stream amounting to the size of a large creek, and in the same distance offers no opening worthy the name of a harbour. The northern shores are indeed, in all their extent, low and sandy, rising slowly from the margin of the lake.

A small river, the Ouse, or Wellard, enters the north-east part of lake Erie, between Norfolk and Lincoln counties; and in a commercial point of view it is now becoming of great consequence.*

Turning our attention to the south-east shore of lake Erie, at the head of Niagara river, we perceive a slope extending about 30 miles inland, and down which flow a few large creeks, the principal of which are Buffaloe and Cataraugus; but, advancing south-west up the lake beyond the valley of the latter creek, we are presented with an interesting phenomenon. The sources of the Ohio valley rise within five miles from the lake shore. Continuing south-west, this very narrow inclined plain widens slowly for a distance of 230 miles to the sources of Maumee

* See Canals.

river, where it reaches 100 miles inland. The length of the rivers correspond to the width of the plain down which they flow, and Conneaut, Grand river, Cuyahoga, Rock river, Black river, Vermillion, Huron, Sandusky, and Maumee, are, with the exceptions of Cuyahoga, nearly in the proportions of length to the graduations of a regular scale.

With the western curve of Erie, the inclined plain which supplies its rivers curves also, and is continued to the northward, forming south-eastern Michigan, and beside many lesser streams, discharges the rivers Raisin and Huron into this lake.*

The elevation of the summit level in the state of Ohio, which constitutes the southern protrusion of St. Lawrence basin, is about four hundred feet above lake Erie, or in round numbers, nearly one thousand above the Atlantic tides. This must, however, be understood as the mean elevation, as the Ohio ridge rises gradually from south-west to north-east, and in north-western Pennsylvania, and south-western New York, is at least 1400 feet above the Atlantic level.

The rivers of Erie are, without exception, obstructed with bars at their mouths, affording, as I have said before, in no one instance, 8 feet water. A small group of islands, called the Bass islands, and situated near the south-western curve of this lake, has in one of the central islands a harbour, Put-in-Bay, with 12 feet water, which is the most easy of

* Here occurs a remarkable instance of the great confusion of our geographical nomenclature. There is a Huron river rising in central Michigan, and which falls into lake St. Clair. A second Huron heads with the first, and flowing south-east enters lake Erie, at the western side of the mouth of Detroit river; and a third Huron rises in Crawford and Richland counties, Ohio, and crossing Huron county, falls into lake Erie. Is not this heaping difficulty on confusion?

This volume lacks the map, "Falls of Niagara and adjacent country," which should face page 209.

A photostatic copy of the map may be found in the Map Room of the Library.

We may remove the comment useful, but a less seductive description, by a particular notice of the Falls of Niagara. I have visited this scene of elementary strife, and suppose my feelings nearly those which every mind must, more or less, indulge as it is approached. My first visit was near sun-set, of a fine calm evening, July 29th. Slowly, I heard the deep, long, and awful roar of the cataract. My mind, which for years had dwelt with anticipation upon this greatest of the world's traits, approached the scene with fearful solicitude; I beheld the permanent objects, the trees and the rocks; and I beheld also the passing clouds that momentarily flitted over the most interesting picture that nature ever painted, and exposed to the admiration of intelligent beings. But as darkness closed I retired, determined to return to the scene of real delight and behold its beauties amid the beams of a rising sun. But I could not for a moment abstract my mind from the object I had dimly seen, and in fancy conceived the beauties, the horrors, and the wonders, the coming morning would produce.

That morning came; it was clear and serene. 1

hasted to the brow of the precipice. I expected much, and was not disappointed. The splendours of the scene burst at once on my view. The noise of the falling mass of waters is heard more and more distinct as the observer advances.

I approached it from the New York shore, from which it is so obliquely seen as to destroy its best effects; but defective as was this my first distinct view of Niagara, the perspective displayed beauties infinitely transcending any I had ever before seen. The beams of morning glanced upon the curling volumes that rose from the abyss beneath. My eye sought the bottom of this awful gulf, and found in its bosom, darkness, gloom and indescribable tumult. My reflections dwelt upon this never ending conflict, this eternal march of the elements, and my very soul shrunk back upon itself. The shelving rock upon which I stood, I felt actually trembling under my feet, and the irresistible flood before me seemed to present the pictured image of evanescence. The rock was yielding piece-meal to ruin, fragment after fragment were borne into the terrible chasm beneath; and the very stream which hurried these broken morsels to destruction, was itself a monument of changing power.

With some reluctance I retraced my steps to my lodgings, but soon after returned, and descending the almost perpendicular bank of rocks, found myself under that tremendous FALL OF WATER, which even in mere defective description has excited, and ever must excite, the admiration of cultivated man. I crossed Niagara strait about 250 yards below the *chute*. The river was ruffled by the conflict it had sustained above, but no real danger threatened the passenger. Perpendicular and rudely broken walls of rock rise on both banks, far above the fall, and raise their frowning precipices to the *appalling* height of between two and three hundred feet. The trees which fringe the upper selvedge of

these mural banks, appear, when seen from below, like shrubs. I was completely drenched by the spray of the cataract; but the sublime picture spread before my eyes was too impressive to admit reflection upon a momentary inconvenience.

The river below the falls flows with considerable rapidity, but with less velocity and turbulence than I had anticipated. The opposing banks are strikingly similar; both being perpendicular, perhaps half the descent, and towards the base slopes extend, composed of the fragments which have been torn from their original position above.

Most maps of Niagara are very defective; they represent the river above and below the falls as continuing very nearly the same course. This is so far from being the fact that the bend immediately at the ledge over which the water is precipitated forms an acute angle, the salient point projecting into Canada. The river above the falls, bears a little E. of N., and below turns to N. E., which course it continues about a mile, and thence inflects to a northern direction, which, with some partial curves, is preserved to lake Ontario.

Between the lower extremity of Grand Isle and the mouth of Chippewa, the Niagara river is upwards of a mile wide, but contracts rapidly as the inclination of the plane augments. As high as the mouth of Chippewa river, the banks are not greatly elevated above the water level, but apparently rise, advancing towards the *chute*. This change of relative height is only a deception in vision, occasioned by the wear of the bed of the river. The general level of the country is preserved to Queenstown heights.

Many contend that the best point of view is from Goat Island. Of this I am unable to speak from experience, but judging from relative position, am inclined to think that the table rock affords by far the *most favourable view*, combining the advantages of

a profile and front perspective. The table rock I did not visit. The rapids above the main fall, are, however, little less worthy of attention than the fall itself, and can certainly be seen to much advantage from Goat Island.

The rapids, particularly on the Canada side, afford a scene of sublimity and grandeur; tumbling over ledges of rock, many of which are 8 or 10 feet perpendicular descent. These ledges are indeed productive of a series of cataracts, over which the irresistible volume rolls its terrific mass towards the still more awful scene below. Though more confined in width and quantity of water, the New York channel has also its appropriate beauties and attractions to the traveller. Many small islands clothed with stunted cedars, stand between the main shore and Goat Island, round which the foaming surge dashes with endless rage. One of these islets hangs upon the brow of the falls, and produces a small middle sheet of ten or fifteen yards wide, rising in mimic majesty between the two gigantic torrents on each side.

No adequate idea can be formed from description of this wonder of interior North America. Its pitch in feet,* its width, velocity, and consequent mass, can be determined with a near approach to accuracy; but the effect as a work of nature can only be produced from actual view. If the massy walls of rock, and the rapids above, are excepted, there is no other object near Niagara, that is striking in the scenery. It is left alone in simple and sublime dignity to impress upon the soul a sense of majestic grandeur, which loss of life or intellect can alone

* If the following notice is correct, the pitch or direct fall of Niagara has hitherto been over-rated. "The perpendicular height of Niagara Falls has been ascertained by accurate measurement, to be 158 feet 4 inches."—*Philadelphia Sat. Eve. Post*, Sept. 29th, 1827.

obliterate, and the force of which no language can convey. If towering mountains and craggy rocks surrounded Niagara, I cannot believe but that much of its fine effect would be lost. As it is, it is an image whose whole contour is at once seen, and the view unbroken by extraneous objects. Even sound is subservient to the impression made upon the heart; none is heard, except the eternal roar of the cataract. I would have been rejoiced to have seen this place in a tempest. The whole time I was there, the weather though warm was clear, serene, and pleasant. Amid the howling of the black north-west wind, Niagara must have something of more than common interest. I am strongly inclined to believe that winter alone can give to the falls all its most appropriate attendant imagery. But, at all times, at all seasons, (and might I not say, by all minds?) will this matchless picture be viewed with wonder and delight, and remembered with feelings of pleasure.

A few days after my return to the city of New York, from Niagara, I met with and read the 4th Canto of *Childe Harold*. It is a description of the cataract of Vellino. Words of fire! made use of to paint an object, in itself no doubt worthy the mighty genius of the greatest modern poet; but an object, compared to which, Niagara is as a towering mountain beside a rose shrub. If Lord Byron had given intellectual existence to this grand effort of a master mind, under the very spray, in view of the emerald verge, and with his soul aroused to heaven by the sound of the waters of Niagara, his imagery would not have more vividly portrayed this scene, whose parts a poet alone can describe.

“The roar of waters!—from the headlong height,
Velino cleaves the wave-worn precipice;
The fall of waters! rapid as the light,
The flashing mass foams shaking the abyss;

The hell of waters! where they howl and hiss,
And boil in endless torture; while the sweat
Of their great agony, wrung out from this
Their Phlegethon, curls round their rocks of jet,
That gird the gulf around, in pitiless horror set,

And mounts in spray the skies, and thence again
Returns in an unceasing shower, which round
With its unemptied cloud of gentle rain,
Is an eternal April to the ground,
Making it all one Emerald:—how profound
The gulf! and how the giant element
From rock to rock leaps with delirious bound,
Crushing the cliffs, which downwards worn and rent,
With his fierce footsteps, yield in chasms a fearful vent

To the broad column, which rolls on and shows
More like the fountain of an infant sea
Torn from the womb of mountains by the throes
Of a NEW WORLD, than only thus to be
Parent of rivers which flow gushingly
With many windings through the vale:—Look back!
Lo! where it comes like an eternity
As if to sweep down all things in its track,
Charing the eye with dread,—a matchless cataract.

Horribly beautiful! but on the verge
From side to side, beneath the glittering morn,
An IRIS sits, amidst the infernal surge,
Like HOPE upon a death bed, and unworn
Its steady dies, while all around is torn
By the distracted waters, bears serene
Its brilliant hues with all their beams unshorn,
Resembling, 'mid the torture of the scene,
Love watching madness with unalterable mien.”*

* This description of the cataract of Niagara, and quotation from the *Childe Harold*, were inserted in Darby's *Tour from New York to Detroit*, and published 1819.

Only with this description, can be compared that of Charybdis by Homer: it cannot be presumption to say it has no other equal in literature. Let any person of warm fancy read those lines in view of Niagara, on a fine summer morning, and whilst the Iris beams upon his eye, he will exclaim, "This is indeed the language of wrapt poetry."

The natural beauties around Niagara are not confined to the Falls and Rapids. From the heights above Queenstown, a prospect opens only second to the Falls themselves, though very distinct in character.

The wide sweeping alluvial plain of lake Ontario lies beneath, chequered with meadows and farms; the deep and impetuous strait issuing in its dark profound from the shelving rocks above the two towns of Lewistown and Queenstown; and far on the back ground, the ocean-like expanse of lake Ontario closes the perspective.

It is when standing on the brow of these heights, that the fact becomes demonstrative, that here once dashed Niagara, mingling his foaming surge with the waves of Ontario. The rocky bed has yielded to the ever-rolling waters, and the cataract has retired to the deep and distant dell, where it now repeats the thunders of ages, and continues its slow but certain march to Erie. Time was when Niagara did not exist, and time will come when it will cease to be! But to these mighty revolutions, the change of empire is, as the bursting bubble on the rippling pool, to the overwhelming volume that crushes the cliff of Niagara itself. Since this cataract fell where Queenstown now stands, have risen and fallen, Assyria and Babylon; Persia and Macedonia; Carthage and Rome. The flood of northern barbarians issued forth from their native wilds, and in the storm of savage fury, profaned the tombs of the Fabii and the Scipios; and in the march of time, the polished sons of these mail-clad warriors, now

seek, with religious veneration, the fragments of the statues which their forefathers broke; and whilst this moral stream was flowing through the wide expanse of ages, has the Niagara continued its unceasing course. Roused from the slumber of a thousand years, the energies of the human mind sought another world, and reached America; and amid this new creation found Niagara. During the change of nations, religion, and language, this vast, this fearful cataract unceasingly pursued and pursues its slow and toilsome way.

The vicinity of Niagara has in some measure become classic ground. The events of the last war between Great Britain and the United States, have been rendered remarkable by some of these events which continue land-marks in history. The incipient grandeur of our navy, and the glorious termination of the contest, were events beyond rational hope. But on no other part of the theatre of this war, were the operations of the respective armies more sanguinary, nor the contest between rival battalions so obstinate as on the Niagara river. Perhaps to the numbers engaged, no battles were ever more obstinately contended, or victory more dearly bought, than were those of Queenstown, October 8th, 1814, in which Gen. Brock was killed; that of Chippewa, July 5th, 1814, and that of Bridgewater. There is no other scene, however, which the traveller visits which so little answers his anticipations as that of a field of battle. In the splendid accounts of fine positions chosen, defended, or lost; the movements of armies, their shock, their victory, or their rout, we are apt to expect something uncommon in the scenery where such events happened, and as exciting high interest on review; but when seen, this illusion vanishes, and the eye finds only the common objects *in nature* to render conspicuous the theatre of the *greatest battles*.

But we now resume our geographical review of the St. Lawrence basin. The ridge, or more correctly slope down which Niagara is precipitated, commences in Upper Canada, towards Lake Huron, and is by some supposed to be the same ledge which is continued in the Manatoulin Islands. Extending south-eastward, it reaches and crosses Niagara river, enters the United States, and inflects to the eastward, forming the lower terrace of the middle sub-basin of St. Lawrence. By actual measurement, the surface of Lake Ontario is depressed below that of Erie, 334 feet.

Ontario is itself the higher reservoir of the lower sub-basin of St. Lawrence; and passing from Erie basin to that of Ontario, a very marked change in the natural physiognomy of the country is perceptible. The confluent of Erie possess very little of the lake character, but the contrary is the case with those of Ontario, Genesee river excepted. The following table will, however, exhibit in a condensed view the relative height of the two sub-basins.

No XIII.—*Table of the relative heights of the Lakes Superior, Huron, Michigan, Erie, Ontario, &c.*

	FEET.
Superior	641
Huron and Michigan	600
Erie	565
Ontario	231
Crooked Lake in Yates and Steuben counties, New York	700
Canandaigua Lake	680
Aqueduct at Rochester	499
Seneca Lake, at Geneva	440
Rome level	420
Seneca river, at Montezuma	371
Cayuga Lake	400
Lake Champlain	901

Before proceeding, however, to examine the more minute features, it may be necessary to sketch the outline of the lower sub-basin of St. Lawrence. This widely extended section of the continent of North America is composed of two very unequal inclined planes. That of the right, or south-east, about 750 miles in length, does not exceed a mean width of 60 miles; but that of the north-west extends over 900 miles in length, with a mean width of 270 nearly, with an area of 287,000 square miles.

It is a circumstance of singular interest, that the course of St. Lawrence from its efflux from Lake Ontario, to its real mouth above the island of Anticosti, is almost parallel to the general bearing of the opposite coast of the Atlantic ocean; and if the entire space from the north-west sources of the lower sub-basin of St. Lawrence, to the Atlantic coast, is engarped in one sweep of vision, the channel of that great river or strait, will form a line of very nearly equal division.

The preceding data may serve to give the reader an idea of the immense extent of the St. Lawrence basin, and of the territory included in the Canadas. A very intelligent gentleman of Canada told me, in that country, that there was land within its limits sufficient for twenty millions of inhabitants. He might have very safely doubled the estimate.

Surveyed physically, and commencing with Niagara river, we have found a sudden depression of 333 feet in 25 direct miles, from Lake Erie to Ontario. Following the southern shores of the latter upwards of 70 miles, we find only small creeks, but at length arrive at the influx of a stream of some magnitude. This is the Genesee, rising on the table land of northern Pennsylvania, at N. lat. $41^{\circ} 52'$, at an elevation of at least 1200 feet, and flowing with a general bend westward, but inflecting again to the E. of N., having an entire course of 100 miles, and falling into Lake Ontario in nearly the long. of its

sources, $0^{\circ} 50' W.$ The sources of the Genessee are on the extreme southern part of the basin of Ontario.

With the north-western sources of Susquehanna intervening, the valley of Genessee is followed by another of singular structure, that of Seneca, Onondaga, Oswego, or Oneida. As I have a choice, I shall use the most ancient and most common appellation Oneida.

The Oneida river is formed by two branches, that of the Oneida proper to the south-east, and the Seneca south-west. Both these branches have gained intense interest from the route of the Erie canal passing over their respective vallies.

Oneida proper has its most remote source in Lewis county, New York, at $43^{\circ} 40'$, in Fish creek, between the sources of Salmon and Black rivers. Flowing a little W. of S 35 miles, Fish creek receives Wood creek from the east. The latter rises on the summit level between the Mohawk and Oneida vallies, near Rome, in Oneida county. It is by the flat intervening plain between these two streams, and at an elevation 420 feet above the Atlantic ocean, that the Erie canal leaves the basin of the Hudson, and enters that of St. Lawrence.

Immediately below their junction, Wood and Fish creek are merged in Oneida lake, a sheet of water 20 miles in length, and with a mean width of 4 miles. Into Oneida lake, beside the united waters of Wood and Fish creeks, are poured from the south-east, Oneida creek, and the united waters of Chittinengo and Canasatego creeks, with some of little note from the north.

From the western angle of Oneida lake, its waters are again discharged in a river of the same name, which flowing by a very circuitous channel of 16 miles, but in a direct distance west of about 8, unites with the Seneca.

The valley of the Seneca is peculiar in physical geography. If we recur to the notice already given of the position of the terrace which produces the Niagara Falls, and trace its range eastward, we shall find it following the general course of Lake Ontario, and we shall find it producing the falls of Genessee, at Rochester, and again rising and winding eastward between the small creeks flowing into Lake Ontario, and the valley of Seneca, for about 60 miles, until again broken by the Oneida river. Within this ridge of hills, is enclosed a valley, or minor basin, presenting peculiar features. East from Genessee river, about N. lat. $42^{\circ} 45'$, a chain of lakes commences which individually range like radii, having the interior of Lake Ontario as their centre. Canesus, Hemlock, Scancatica, Honeoye, Canandaigua, Crooked, Seneca, and Cayuga lakes, lie longitudinally from north to south nearly, but preserving a position approaching closely to right angle from the southern shore of Lake Ontario; those west of Seneca lake have a slight declination from the meridian to N. E. and S. W.; but with Seneca, this declination is reversed, and increases in Cayuga, Owasco, Skeneateles, Ottisco, Onondaga, and Oneida, the latter extending W. of N. W.

The relative elevation of the parts of Seneca valley is shewn in table 13, page 217. The summit level between the head of Seneca lake, and the Chemung branch of Susquehanna, at Newtown, is given in table 5, at 885 feet; and in table 13, we find Crooked lake elevated above the Atlantic ocean 700, and Canandaigua lake, 685 feet. Consequently, the higher lakes of the Seneca valley are depressed only about 200 feet below the summit level between the two great basins of St. Lawrence and Susquehanna. The lakes of Seneca valley, depress rapidly, advancing to the N. E. down the stream; in so much that Cayuga level is 300 feet below that of Crooked lake, in a distance of 25 miles. Montezuma on the outlet

of Seneca and Cayuga united, and on Erie canal, lies 329 feet below Crooked lake, and 140 above the surface of Lake Ontario. Crooked lake is elevated above Ontario 469 feet, though distant at the nearest points of approach only about 42 miles.

From the preceding elements, it is demonstrated, that the Oneida basin, from Crooked lake to the mouth of Oneida river, has a descent of 469 feet, and from the general level of the north-east part of Steuben county, of more than 900, perhaps 1000 feet. All the lakes which chequer the Seneca valley lie in deep chasms; the adjacent and intervening country rising steeply and to considerable elevation.

It may again be noticed as illustrating the peculiar features of this region, that the Rome level is only 189 feet above the level of Ontario. I have not learned the relative height of Oneida lake, but as it lies below the summit at Rome, it does not, it is probable, rise 100 feet above the surface of Ontario.

When treating on the topography of New York, the preceding data will be again noticed; but I cannot in this place dismiss the subject without some passing remarks.

The climate along the shores of Erie and Ontario presents some phenomena which are very anomalous, unless due regard is had to the relative height of the adjacent country. In their entire length, from the mouth of Detroit river to Sackett's harbour, Lakes Erie and Ontario are bordered by an alluvial plain of more or less width, and differing slightly in elevation above the surface of the respective lakes. From this extended alluvial line, the country rises in the state of Ohio, to 400 or 500 feet; in Pennsylvania and New York, to perhaps 800 feet above Erie, and in its prolongation eastward to 1000 or 1200 feet above Ontario.

To any person who has paid attention to the theory of atmospheric temperature, it will be at once evident, that along the whole southern side of St.

Lawrence basin, from the sources of Maumee, in Ohio, to those of Black river and the Mohawk, in New York, through 500 miles, the increase or decrease of temperature is inverse to the latitude. In vulgar estimation, the superior mildness of the winters along the lake shores, over that of the same season, 30 or 40 miles inland to the southward, is accounted for from the agency of water, but the great difference of level, equivalent to more than two degrees of latitude, is unknown or overlooked. Indeed there is no other phenomenon in physical geography, more capable of deceiving the most practised observer, than is the difference of level. Baron Humboldt remarks his astonishment, on finding, by a barometrical operation, that Lima was between 500 and 600 feet above Calao its port, though only six miles asunder, and apparently nearly on the same level. I have several times traversed the ground 16 miles between Geneva and Canandaigua, and would never, certainly, have suspected, from the aspect of the country, that the two lakes on which these two villages are situated, differed 240 feet in level. See table 13.

I shall have another occasion also, to notice a fact which may seem at the first blush incredible; that is, that the city of Pittsburg is situated 235 feet above Lake Erie, though the sources of Alleghany river, one of the constituents of Ohio, at that city, rise within four miles from the margin of the lake. It is the accurate regard to such features, however, which makes the difference between the mere *traveller* and real *observer*.

On its northern side, Ontario receives but one inlet worthy of notice, the river Trent, entering near the head of St. Lawrence. This river, or rather chain of lakes, originates in the interior of Upper Canada, in an intricate series of shallow lakes; the *general slope* of which must amount to at least the *difference of level*, 387 feet, between Lake Huron

and Lake Ontario. The chain of Trent lakes is again continued towards Machedash bay, of Lake Huron, by the name of Severn river. The acclivity of the northern shore of Ontario, must exceed that of the south. The dividing line of the waters of Huron and Ontario, approaches to within twenty miles from the north-west margin of the latter. In long. 2° W., however, the dividing curve is inflected to the north in the Trent valley, to about 55 miles from Lake Ontario, and separates the waters of the two lakes in Talbot portage, 80 miles a little E. of N. from York, in Upper Canada. From the Talbot portage, the Trent lakes range 60 miles to the south-east, and contracting into a river, assume the name of Trent. By a bold sweep to the northward, and a very winding channel of 50 miles, the Trent is finally lost in the Bay of Quinte. This bay, and the shores of Lake Ontario, enclose a peninsula forming the county of Prince Edward. The Bay of Quinte is itself merely an enlargement and continuation of the Trent, which extending east 30, thence south 15, and finally, north-east 20 miles, merges into Lake Ontario, 20 miles above the town and harbour of Kingston, and head of St. Lawrence river.

A canal line has been proposed, by the Bay of Quinte, and the rivers Trent and Severn, from Lake Ontario to Gloucester bay of Huron. Amongst the many artificial improvements of the natural navigable routes in the interior of N. America, few would be productive of more benefits than that we have noticed. Independent of more safety to life and property, on a line of canal transportation, over that in open and immense lakes such as Ontario, Erie, and Huron; there would, in the instance before us, be a saving of more than half the distance. It is, by the proposed canal route, not 300 miles from Kingston or Sackett's harbour into Huron; whilst by the lengthened navigation of the large lakes and connecting straits, the distance exceeds 600 miles. It

may, however, be borne in mind, that to effect a canal line, a height must be overcome equal to the difference of level between Huron and Ontario, or 387 feet; but it is an improvement too obviously useful and practicable, to be longer neglected than what the slow increase of population and wealth will render insuperable. An attempt is now in operation, and nearly completed by the Ouse, or Grand, and Welland, or Chippewa rivers, to form a canal from the north-east shore of Lake Erie, into the western part of Lake Ontario. This work called the Welland canal is intended to admit vessels of from 60 to 90 tons burthen;* a size of vessels equal to the draught of those built on Lake Erie; and which, when the canal is completed, will remove the Falls of Niagara as far as internal commerce is concerned.

From the preceding elements, it is obvious, that Lake Ontario is the lower stage of an enormous chasm on the earth's surface. The rivers on every side pour into its bosom by rocky and precipitous channels; and not one navigable to any considerable distance without interruption from rapids, or in most instances, direct falls. The last of those confluent we have to notice is Black river, the mouth of which forms Sackett's Harbour. This stream rises in Herkimer and Oneida counties, New York, interlocking sources with the Mohawk, West Canada, Fish creek, and Sacondago rivers. Flowing a little W. of N. 50 miles by a very impetuous current over Lewis county into Jefferson, turns abruptly to S. W. by W., 12 miles to Watertown, where it again inflects to nearly west 12 miles to Sackett's Harbour; having an entire comparative course of 74 miles. The lower falls, 7 or 8 feet perpendicular, of Black river, is at Brownville, 8 miles by the channel above

* Evidence of H. J. Bolton, Solicitor General of Upper Canada, before a Committee of the House of Commons. *Vide Nat. Intel.* Nov. 4, 1826. No. 3980.

the harbour at Sackett's; the whole river may indeed be considered as a series of falls, which in less than 70 miles exceeds an aggregate depression of 1000 feet.

Another phenomenon which distinguishes Lake Ontario, is the convincing evidence of an abasement of its surface, afforded by its alluvial shores. Such evidence it may be conceded, however, exists around each of the other great lakes in the St. Lawrence basin, but in no other instance so strongly marked as it is along the margin of Ontario. This evidence goes far beyond the ordinary appearance of either ancient or recent alluvial deposits.

"From near the Genessee river to Lewistown, on the Niagara river, there is a remarkable ridge or elevation of land, running almost the whole distance, which is 80 miles, and in a direction from east to west. Its general altitude above the neighbouring land, is 30 feet, and its width varies considerably; in some places it is not more than 40 yards. *Its elevation above the level of Lake Ontario is, perhaps, 160 feet*, to which it descends by a gradual slope, and its distance from the water is between six and ten miles. There is every reason to believe, that this remarkable ridge was the ancient boundary of this great lake. The gravel with which it is covered, was deposited there by the waters, and the stones every where indicate, by their shape, the abrasion and agitation produced by that element. All along the borders of the western rivers and lakes there are small mounds, or heaps of gravel, of a conical form, erected by the fish for the protection of their spawn. These fish-banks are found at the foot of the ridge, on the side towards the lake; on the opposite side none have been discovered. All rivers and streams which enter the lake from the south, have their mouths affected with sand in a peculiar way, from the prevalence and power of the north-westerly winds. The points of the creeks which

pass through the ridge correspond exactly in appearance with the entrance of the streams into the lake. These facts evince, beyond doubt, that Lake Ontario has receded from this elevated ground; and the cause of this retreat must be ascribed to its having enlarged its former outlets, or to its imprisoned waters (aided probably by an earthquake) forcing a passage down the present bed of the St. Lawrence.*

Wherever I have myself examined the banks, shores, and alluvial plains near any of the lakes, but particularly those adjacent to Ontario, the correctness of Mr. Clinton's conclusions were to me manifest. When the surface of Lake Ontario stood at 170 feet above its actual level, the Falls of Niagara did not exist! Whether this stupendous revolution was effected by sudden or slow change it is difficult to determine; but it is probable that causes may have combined to produce great momentary alteration, and before or afterwards, the revolution completed by slow abrasion. It would be an unprofitable, because an unsatisfactory, inquiry, to attempt fixing the time of the *desechement* or more correctly draining of this inland sea.

The north-east part of Ontario is a congeries of islands, which is continued down the St. Lawrence about 50 miles. This part of the river is from 10 to 2 miles wide, without much current, and known by the local name of "*The Thousand Islands*." The number actually amounts, if every naked little rock is taken into the list, to upwards of 1500. The peninsula of Prince Edward, and the small islets outside of Sackett's Harbour, are the higher eminences of this group, which thus extended into Lake Ontario, exceeds 100 miles in length.

* De Witt Clinton, in Collections of the New York Historical Society; and Introductory Discourse to the literary and Philosophical Society of New York, p. 52.

The small streams entering St. Lawrence on both sides of the Thousand Islands, serve by their courses to throw much light on the structure of this remarkable tract. Black river, which I have already noticed, flows for the first 50 miles of its course directly towards the St. Lawrence, until within 20 miles of that great stream, when suddenly turning it enters Lake Ontario.

Immediately below the valley of Black river follows that of the Oswegatchie. The latter stream is composed of two branches, Oswegatchie proper, and Indian river. These two constituents of Oswegatchie rise in Lewis county, and flow to the north-west, parallel to each other and to the Black river of Lake Ontario, and again obeying the bend of the latter above Watertown, the three channels loop on each other like spoons; but the two branches of the Oswegatchie, in place of continuing the lower course of Black river, turn upon their own courses by a very acute angle, and flowing a little E. of N. about 40 miles, unite 5 miles from the St. Lawrence, which they enter at Ogdensburg, 10 miles below the Thousand Islands.

On the side of Canada the water courses are inflected in a similar manner, though King's river and the outlet of Gananoquin lake flow S. S. W., and the Rideau branch of the Ottawas N. N. E.; all following, or nearly so, a parallelism to St. Lawrence. Like conformation of country is again shewn in the courses of Grass, Raquette, and St. Regis rivers, which drain Hamilton, Franklin, and St. Lawrence counties, New York, and enter St. Lawrence river nearly together in N. lat. 45° , at St. Regis village, opposite Cornwall in Upper Canada, and at the head of Lake St. Francis.

Thus for a distance of 110 miles from its efflux from Lake Ontario, the St. Lawrence pursues a north-eastern course down one of a series of parallel valleys, presenting in its own and the channels

of its confluent a strong resemblance to similar phenomena in the middle sub-basin of the Hudson.

Before quitting the great internal sea of Canada, and entering on a survey of the lower part of St. Lawrence basin, I deem it necessary to insert some comparative estimates. The Canadian sea has been very justly designated the most extensive repository of fresh water on the globe; but it is a great mistake in relative geography to give Lake Superior the title of the American Caspian. I have shewn that the entire water surface of the Canadian sea covered 72,950 square miles. The Caspian, measured on Herisson's and Arrowsmith's maps, covers an area of 124,000 square miles. Consequently the whole water surface of the Canadian sea compared with the Caspian is only as 73 to 124, or not much above one half.

In one respect the inland seas of America and Asia are but too similar, if we except lake Ontario. The Caspian shores are very deficient in deep harbours, the water is shallow, and navigation difficult and dangerous. The mouths of the Ural, Wolga, Kur, Kizilozein, and Tredjend, are impeded with sand bars, and in some with rocks. In the Canadian sea, above the falls of Niagara, it is generally only in the rivers that safe anchorage can be found, and in many parts for great distances no kind of shelter is offered by the lake shores. In the natural laws of navigation, a shore is to the navigator in a storm either his haven of safety or gulf of destruction.

There are many reasons to induce a belief that the Caspian is gradually diminishing; several travellers, and amongst others, the acute Pallas, have given that opinion from actual observation. Mr. De Witt Clinton expressed to me the same opinion respecting the Canadian sea; an opinion in which I *fully concur*; but the diminution of the latter arises, *it is probable*, from a deepening of the channels of *tlet*, rather than from evaporation. The evidence

of the very great depression of the surface of lake Ontario has already been given; but the memoria, to prove depression of water surface, are by no means confined to the Canadian and Caspian basins. The parallel roads or lines, so minutely delineated in Brewster's Encyclopædia, and found so common in the vallies of Scotland, communicating with the great Caledonian glen, and like phenomena in the vallies along the Upper Rhone, are specifically similar to the natural road along the margin of the Ontario alluvion. The depression of the Baltic, at the rate of 3 5-6 feet in a century, is now a determined philosophical fact.

Along both sides of the Atlantic ocean, evidences too strong to be resisted, and too numerous and wide spread to remain unobserved, attest, that when or since the present order of things commenced on this planet, the surface of that vast mass of water stood several hundred feet above its present level. Time was therefore when neither the St Lawrence or the Bosphorus of Thrace, existed; when the Appalachian, the Alpine, and the Dopine systems were the nuclei of extensive islands, and when the Black, Caspian, and Baltic seas were united: and are we not warranted in the induction that this terrific process is still advancing? I have already shown that an elevation of 90 feet would suffice to introduce the Atlantic tides into lake Champlain, and of 140 insulate that part of North America, enclosed by the Atlantic ocean, and the St. Lawrence, Sorrel, and Hudson rivers. 231 feet would force the ocean tides into lake Ontario, and would, on the opposite side of the Atlantic, reunite the Mediterranean with the Caspian sea, and Indian ocean; and would again join the Baltic with the Frozen ocean, and insulate the Scandinavian peninsula.

Many of the consequences which naturally and certainly must flow from an actual diminution of oceanic water are repugnant to human feelings, but

to deny what is true and contend for what is false, merely because our feelings are enlisted in the investigation, is any thing but philosophy. If an order of things is approaching which will produce a great and expansive change in the physiognomy of the earth, our scepticism will not for a moment retard its accomplishment.

The quantity of water discharged by the Canadian sea through Lake Ontario, is truly one of the most interesting problems in physical geography. No other river of this globe differs so much in the mass of contained fluid, and its annual expenditure, as the St. Lawrence. I have given in table 14, page 231, the water surface of St. Lawrence, and the individual and aggregate superficies of its lakes, expressed in square miles; and I may add, that the depth of the lakes is very unequal, and difficult to reduce to a mean. In such calculations minute accuracy cannot be expected; I hope, therefore, that the reader will accept the following table as an approximation to an estimate of the mass of water contained in the St. Lawrence and its lakes. It appears from the united testimony of every person who has made the necessary experiments, that lakes Superior, Huron, and Michigan, are vast and in some places unfathomable gulfs; that of all the great lakes, Erie is the most shallow, not exceeding a mean of 120 feet; and that Ontario varies from 450 to 534 feet. In order to be within the limits of reality, I have assumed a mean depth of 20 feet for all the surface contained in the last item of my estimate of 1500 square miles, for the superficies of St. Lawrence river, and the smaller lakes. For the three upper lakes, Superior, Huron, and Michigan, I have assumed a mean depth of 900 feet.*

* In one square mile there is 27,878,400 square feet, and on the curve superficies of the earth, 196,797,200 square miles, equal to 5,486,391,060,480,000 square feet.

No. XIV.—*Table of the quantity of Water contained in the St. Lawrence basin.*

	Mean depth in feet.	Superficial area in square miles.	Superficial area in feet.	Solid contents in cubic feet.
Superior,	900	24,000	669,081,600,000	592,173,440,000,000
Huron,	900	19,000	529,689,600,000	476,720,640,000,000
Michigan,	900	15,000	418,176,000,000	376,358,400,000,000
Erie,	120	8,030	223,863,552,000	26,863,626,240,000
Ontario,	492	5,400	150,543,360,000	74,059,334,120,000
St. Lawrence, &c.	20	1,500	41,817,600,000	836,352,000,000
		72,930	2,033,171,712,000	1,547,011,792,360,000

Those who have read the table of the quantity of water contained in the St. Lawrence basin, inserted in my travels from New York to Detroit, at pages 99 and 90, will discover a discrepancy between the

two results. The difference arose from my having, when compiling the enclosed table, subjected the representation of the lakes of Canada to a more rigid admeasurement, and finding that, on the former occasion, I had overrated their aggregate area, and in some measure miscalculated their relative extent. Reduced as is the result, it certainly falls below reality, stupendous as may appear the amount: but assuming the cubic contents, shown by table 14, as the aqueous mass in St. Lawrence basin, the result may well appear astonishing; it would form a cubic column of near 22 miles each side, or if spread round the earth equally on each side of the equator, at a depth of one foot, it would nearly cover the torrid zone, and would actually envelope the earth to upwards of three inches in depth. In positive mass, it may be assumed on very solid grounds, that the St. Lawrence basin contains more than one half of all the fresh water on this planet.

Another problem of great interest next presents itself for solution, that is the quantum of annual discharge, which, though very great, does not from the nature of the basin, bear a near proportion to the contained body of fluid. Three points presented themselves to me as suitable, from which to calculate the discharge:—First, opposite Black Rock in the Niagara strait: second at the head of Ogden's island: and third, at Point Iroquois, a few miles above the second. At all these places the whole volume is contracted to within less than half a mile wide, but flowing with great velocity. In estimating the mean discharge of rivers, a general mistake is prevalent to assume the upper current as that of the whole mass of water. Allowing the St. Lawrence to be three fourths of a mile wide at any of the places I have pointed out, and to flow three miles an hour, with a mean depth of 50 feet, the result would be that a transverse section of the river would contain 105,600 superficial feet, which multiplied by

15,840, the lineal feet contained in three miles, would yield 1,672,704,000 cubic feet as the hourly discharge. This estimate exceeds by more than one-half the quantity which, on another occasion, I calculated for the Mississippi; and, though contrary to my own opinion when I first arrived on the banks of the St. Lawrence, I am convinced falls below reality.

The St. Lawrence is as uniform throughout the year in its diurnal or monthly expenditure, as is the Mississippi for its continual change. A rise of three feet is a more remarkable revolution in the former, than thirty would be in the latter river. Rising from the same vast table land, and having such an extended line of interlocking sources, it is worthy of remark, that no two rivers on earth so essentially differ in their general features, as do the Mississippi and St. Lawrence. The former is turbid in many places even to muddiness; the waters of the latter and of its lakes highly limpid. The channel of one river is chequered with innumerable lakes, some of which are of immense extent; whilst in the other no lakes of any note occur: annually, the Mississippi swells and overleaps its bed, overwhelming the adjacent shores; a casual rise of three feet once or twice in any given 50 years, is considered a great rise of the waters of the St. Lawrence. The Mississippi, flowing from north to south, passes through a great variety of climes, whilst its rival, winding from its source in a south-east direction to near N. lat. 41° , turns gradually to north-east, and again flows into its original climate of ice and snow. The Mississippi, before its final discharge into the gulf of Mexico, divides into a number of channels, having their separate egress; the St. Lawrence imperceptibly expands to a wide bay, which ultimately opens into the gulf of the same name. The banks of the Mississippi, particularly near the mouth, present a level scarce rising above the superior or highest spring floods of that stream

those of the St. Lawrence generally slope from the river margin by an elegant acclivity; and when cleared from timber have the aspect of a most delightful basin. Much of the surface within the Mississippi basin are regions of open grassy plains, where few shrubs or trees break the dull monotony of the landscape; nearly the whole St. Lawrence basin, in a state of nature, is covered with a continuous and almost impervious forest. Such are the leading and contrasted features of these two great North American rivers.

Much more could be said on the subject of comparison between those rivers, but the necessary brevity of this view sets a limit to our survey, beyond which we cannot pass, and must therefore proceed to examine the residue of the St. Lawrence basin. I may remark, that vast as is the amount of water contained in the St. Lawrence basin above the points at which my estimates were made, the accession below those points is enormous. When the river issues from lake Ontario, the channel gradually becomes narrower, 75 miles down to Point Iroquois. In this distance the current imperceptibly increases, but continues very gentle, 65 miles to the Galloupe islands, 5 miles below the mouth of Oswegatchie. With the Galloupe commence a series of rapids, which are but little interrupted to the head of lake St. Francis, immediately below N. lat. 45°. Here the river dilates into a lake of thirty miles in length, and from one to six miles wide. At the lower end of this lake the river again contracts into a narrow channel of 16 miles, very much interrupted with rapids, the principal of which at the Cedars, is very difficult and dangerous, but followed by lake St. Louis, a sheet of water sixteen miles by from one to seven or eight.

At the head of lake St. Louis commences the island of Montreal, at the north-west angle of which Ottawa joins the St. Lawrence from the north-

west. The Ottawas is one of the greatest branches of the St. Lawrence, rising in the mountains which wind north from lake Huron, at N. lat. 48° , and long. 6° W. Its course is generally to the south-east, with an impetuous current, very much impeded by falls and rapids. Comparative length 450 miles. Like all the confluent of St. Lawrence from the north-west, the volume of the Ottawa is, compared to its length of course, immense. Settlements have been made for about 200 miles up this river, but at any considerable distance on either side of its channel the country remains literally unknown, though as far as explored, the soil is excellent, and overshadowed by a dense forest of very heavy timber.

Such is the body of water in St. Lawrence, where its channels encircle Montreal and Jesus Islands, that the vast volume of the Ottawa makes no perceptible augmentation on the recipient, which pours round the islands over rapids of more or less descent. From the La Chine rapid about five miles above the city of Montreal, and on the same channel, a canal has been constructed, to pass the rapid and to meet ship navigation at that city. The port of Montreal is by the inflections of the stream 580 miles above the island of Anticosti, and yet thus high, vessels of six hundred tons can be navigated.

The confluence of St. Lawrence and the Ottawa is, perhaps, one of the most picturesque spots in the world. Besides some of minor note, three channels form the two large islands, Montreal and Isle Jesus, which unite at Bout de l'Isle, or the lower end of the two main islands. Below Montreal, though the features of the river and its banks undergo no very rapid change, yet, as a navigable stream, the introduction of ships below Montreal gives a new and more interesting aspect to the scenery.

Montreal is situated at N. lat. $45^{\circ} 30'$, and at long. $3^{\circ} 28' E$. At the lower part of La Chine rapid, the river turns to a little E. of N., which course

is continued 22 miles to Bout de l'Isle, where it bends to nearly N. E. 30 miles to the head of lake St. Peter, and entrance of Chambly river, from the south. Lake St. Peter is comparatively shallow, only admitting vessels of 18 feet draught, and though what is usually called by that name, terminates about ten miles above by the contraction of the channel, it may be considered as continued to the head of tide water, at the town of Three Rivers, and mouth of St. Maurice river, from the north.

The head of the tides in St. Lawrence is a remarkable point in the hydrography of North America, and demands particular notice in an elementary view. With the highest ascent of the tides, is attained nearly the level of the ocean, in which the tide wave originates; we may therefore consider the level of St. Lawrence immediately below the town of Three Rivers, as that of the Atlantic ocean. The following table will more clearly exhibit the relative distance from the head of tide water to Lake Ontario, and in a contrary direction to the Atlantic ocean.

No. XV.—*Table of the stationary distances down the St. Lawrence, from Kingston, at the lower extremity of Lake Ontario, to the mouth at the western point of the island of Anticosti.*

	Miles.
Kings to the mouth of Gananoqui river	16
Morristown on the New York, and Brockville, at the lower end of the Thousand Islands in Upper Canada, Leeds county	27—43
Prescott, in Upper Canada, Grenville county	12—55
Ogdensburg and mouth of Oswegatchie, St. Lawrence county, New York	1—56
Galloupe Islands, or Red Mill	12—68
Point Iroquois	5—73

	Miles.
Hamilton, and island of Rapid Plat	3—76
Head of Long Sault Rapids	16—92
Narrows, at the lower end of Long Sault Rapids	10—102
Mouth of Grass River	1—103
Mouth of Racket River	3—106
Mouth of St. Regis river, N. lat. 45°, St. Regis village, opposite Cornwall in Stormont county, Upper Canada, and head of Lake St. Francis	2—108
Bodet river and limit, on the left bank of St. Lawrence, between Upper and Lower Canada	18—126
Lower end of Lake St. Francis	12—138
Rapid of the Cedars, (<i>Rapides aux Cedres</i>)	8—146
Head of Lake St. Louis	4—150
Lower end of Lake St. Louis, and village of La Chine	17—167
City of Montreal	6—173
Cape St. Michael, at Boute de l'Isle	15—190
Mouth of Chambly river and head of Lake St. Peter	30—220
Delta, at the mouths of Yamassee and St. Francis rivers, the former from the south, and the latter from south-east	12—232
Lower end of Lake St. Peter	16—248
Town of Three Rivers, (<i>Trois Rivières</i>) and head of tide water in St. Lawrence	12—260
From Three Rivers to the mouth of river Becancour, from the south-east	5—265
Village of St. Anna, at the mouth of St. Anna river	20—285
Richelieu Rapids	20—305
Village of St. James Cartier, at the mouth of St. James Cartier river	4—309
Mouth of the Chaudiere	25—334
Quebec	6—340
Head of the island of Orleans	5—345

	Miles.
River and Falls of Montmorenci, on the left shore	2—347
Lower end of the island of Orleans	21—368
L'Isle au Coudre	27—395
Mouth of Saguenai river, from the left	55—450
Betsiamitis river, from the left	70—520
Breslard river, from the left	12—532
Black river, from the left	10—542
Cape Coribon, or Cœur Bon, on the left	50—592
Head of the island of Anticosti	100—692

There is some difficulty in fixing on the real mouth of St. Lawrence; the most natural to my own eye is the separation of the great straits above the island of Anticosti; and if that place be assumed as the mouth, then the tide ascends this channel 432 miles, almost four times farther than into the Hudson; and if the Amazon be excepted, the highest tide on earth.

As in the Hudson, the tide in the St. Lawrence passes through a chain of primitive mountains, on a breach in which stands the city of Quebec.* As I have before observed respecting the primitive chain which forms the 'Thousand Islands, I repeat respecting that which traverses the same river near Quebec, that the latter as well as former were once con-

* Is it not the same chain which crosses the Hudson at the Highlands, and St. Lawrence at Quebec? If any conclusion can be safely drawn from analogy in the structure and range of the Appalachian system, this question must be answered affirmatively. From our maps little aid can be obtained in that or any other problem in physical geography. A real minute geological survey of the region enclosed by the Atlantic ocean, and the Hudson and St. Lawrence rivers, would be a most invaluable addition to science.

tinuous, and confined the water above it, in a lake which must have been drained by one of those operations of nature which impose lasting changes on the globe.

"When this opening was made by the force of the included water, the land was laid bare on both sides of that river (*St. Lawrence*), as far as St. Regis, including the islands of Montreal and Jesus; and by the same operation, the land on both sides of Lake Champlain, would be drained as far as Ticonderoga and Whitehall."—*Dr. S. L. Mitchell's Notes on Cuvier's Theory of the Earth*, p. 391.

The ancient lake could not have been bounded by any limit near St. Regis. At that village there exists no land of any considerable elevation above the present level of the water, much less, sufficient to cover Montreal island, or connect Lake Champlain on a similar height with the supposed larger lake above Quebec. No current of any consequence exists in St. Lawrence from Lake Ontario to the lower extremity of the Thousand Islands, consequently the actual depression of that river commences below the latter, near Ogdensburgh. By recurrence to table 15, it will be seen that the lower extremity of the Thousand Islands is forty-three miles below Kingston, and therefore, two hundred and sixty, less forty-three, or 217 miles is the distance in which the water of St. Lawrence falls 231 feet. Therefore if any impediment of that height was raised at Quebec, and the decumbent waters were confined on both sides by barriers of sufficient elevation, the accumulated water would stand level to the mouth of Niagara strait; but it has been shewn that the Hudson and Champlain summit level was only 140 feet above the ocean level, consequently if a rock barrier ever existed at Quebec, to upwards of 140 feet, the St. Lawrence waters passed down the Hudson.

I have suggested the probability of a depression

in the surface of the Atlantic ocean. If such a revolution is admitted, many of the difficulties in the physical geography of the continent of North America will be removed. Is it not probable, that when the margin of the ocean stood at the base of the Appalachian chain, New England, New Brunswick, and the south-east part of Lower Canada, were insulated; and that as the ocean gradually retired, cataracts were produced over the exposed rock barriers? In such a process the outer barrier must yield first, for the plain reason, that until it did in part yield, the more interior barriers would remain submerged. It is therefore probable that the Quebec barrier was broken by a cataract, which finally became removed, and succeeded by another, which in turn sunk before the abrading water and ice. When the second granitic chain was broken, a depression in the depth and great contraction in the extent of Lake Ontario took place. It appears from the phenomena exhibited by most rivers, that schistose secondary yields more slowly to the action of water, than do primitive rocks, though the latter are more solid in their texture than the former. A body of water, and even masses of ice, glide smoothly over horizontal slate, without producing much effect; primitive rocks, on the contrary, by their fractured surface, oppose points of contact to the moving fluid or ice, which tears away the resisting fragments, and in the lapse of time produces an uninterrupted channel.

Below the Thousand Islands, the rapids of St. Lawrence commence, at the Galloupe islands, and occur at unequal distances to the Richelieu rapids, 45 miles below the head of tide water, or through 237 miles. It is in a high degree interesting, that the lower rapids are produced by the tides. When the ocean swell is at the full, Richelieu rapids disappear; but as the tides rise there from 17 to 24 feet, the ebb exposes the rocks. Should the sur-

face of the Atlantic continue to depress, the time will arrive when Richelieu rapids will have a similar aspect to those at the Galloupe islands, Long Sault, the Cedars, and La Chine.

The breadth, strength, and texture, of the composing materials in the bed of the St. Lawrence, render a farther depression of Lake Ontario the work of unlimited ages; and compared with the periods in human history, the present order of things in that channel may be viewed as permanent. No earthquake short of a convulsion which would shake and disrupt the planet to its centre, could remove such enormous masses. I have long indulged an opinion, however, that the accidental agency of earthquakes and volcanoes, had been over-rated, whilst the slow, but constant action of water has met with too little attention from philosophers and naturalists.

We shall close this part of our subject by some remarks on the particular valley of Lake Champlain and Chambly river. The latter is humble in respect to length of course, but is in many other essentials the most important confluent of St. Lawrence. Lake Champlain valley, if taken in its full extent, is occupied by two unequal sub-basins; that of Lake George, and that of Champlain proper, the former nearly 200 feet above the latter.

Lake George is a sheet of water lying in an apparent rent between the adjacent mountains, extending from S. S. W. to N. N. E. 34 miles, with a width from one to three miles, discharging its waters into Lake Champlain, at Ticonderoga. The upper Hudson winds so completely round lake George as to prevent the latter from receiving even a large creek. Lake Champlain, on the contrary, is the recipient of several rivers of some comparative magnitude. This fine sheet of water forms a part of the great North American Glen, and stretches in a direction *very nearly from south to north, and from N. lat.*

43° 30', to 45° 04', or through 109 miles. The breadth varies from half a mile to twelve miles. The depth, similar to the higher and longer lakes of St. Lawrence basin, is in many places prodigious. It is in reality the lower plateau of a deep vale. The rivers Poulteney, Otter, Onion, La Moelle, and Missisque, all rise in the central valley of Vermont, and in their progress into the eastern side of Lake Champlain, pierce the Green Mountain chain, falling in their courses of from 40 to 60 miles, perhaps from 500 to 1000 feet. Similar remarks again apply to the *Riviere au Sable*, Saranac, and Chazy, which enter the western side of the lake, also from a mountainous region.

The fact that the surface of Lake Champlain was only 90, and the summit level between it and the Hudson only 140 feet, has been stated. The ancient union with the Hudson has been restored by human genius and labour, and only a fall of 90 feet is to be overcome to connect its bosom with the St. Lawrence tides by a canal down its outlet, the Sorrel or Chambly. The latter leaves the lake almost exactly on N. lat. 45°, and enters St. Lawrence at the head of lake St. Peter, at N. lat. 46° 03', having a northern course of 70 miles. Nearly at midcourse this stream flows within 13 miles from the St. Lawrence, at Montreal, and in its farther course approaches its recipient by an acute angle. Very little farther labour will be necessary to complete an uninterrupted commercial connexion between this beautiful valley and the two great channels of Hudson and St. Lawrence, and leave to the inhabitants of the basin the choice of marts.

But with Champlain basin, advancing to the N. E., facility of constructing artificial channels of navigation, terminates. The river St. Francis, which rises also in the Appalachian valleys, far within Vermont on one side, and on the borders of Connecticut on the other, draws its remote sources from an

elevated table land, and though disemboqueing into Lake St. Peter, near the outlet of the Chambly, offers very different navigable features. The river St. Francis is formed by two branches, the St. Francis proper, and the outlet of Lake Memphramagog. St. Francis rises in Wolestown, Colerain, and Garthly townships, Lower Canada, in a series of lakes, which discharge to the S. W. and continue in that course 60 miles to the point of confluence with the outlet of Lake Memphramagog.

The latter has its sources in Essex and Orleans counties of Vermont, in a number of creeks which unite in the northern part of the latter, and flowing into Lake Memphramagog, enter Lower Canada between Potton and Stanstead. This lake is a narrow, but extremely picturesque sheet of water, 23 miles in length, from which an outlet of 17 miles unites with St. Francis. The entire length of the valley of Memphramagog, is about 60 miles, extending from N. E. to S. W. with a slope in direct opposition to the St. Francis, though like an indefinite number of other streams in the Appalachian system, which are mutual confluent, the current of the two foregoing are in opposite directions towards each other, and when uniting, turning at nearly right angles to their common valley. This is the case in the present instance; the St. Francis, after the confluence of its two main branches, bends to N. W., and pursuing that course 70 miles into Lake St. Peter, 12 or 13 miles N. E. by E. from the mouth of the Chambly, having an entire course by either branch of 130 miles, spreading over an area of about 5000 square miles.

Few if any of the other small rivers of the United States or Canada, have a more rapid descent; the higher sources of Lake Memphramagog, in the central valley of Vermont, and perhaps also those of Lake St. Francis, rise on an elevated table land, of at least 1000 feet above the level of the Atlantic

ocean. Here again we have another instance of the apparent anomaly of climate, in the St. Lawrence basin. The seasons are much milder on the shores of Lake Champlain, and even on Lake St. Francis, than on the elevated region from which flow in opposite directions, the sources of Kennebec, Connecticut, St. Francis, and Chaudiere rivers. The causes of a difference of temperature, inverse to the latitude, must be obvious from principles repeatedly laid down in this view.

The Chaudiere, the last stream entering St. Lawrence from the right which merits specific notice, is a most impetuous mountain torrent; the richly varied, wild, and romantic scenery of whose banks has excited the admiration of every cultivated mind who has passed along its valley. It is also a classic stream in the history of the United States; as by its banks, General Arnold conducted, early in the revolutionary war, and amid all the rigors of an Alpine winter, a part of that army whose operations in Canada seem to partake of the hue of romance, whilst entitled to the truth of history.

The Chaudiere rises by a creek flowing north into Lake Megantic, and *Riviere du Loup*, interlocking sources with the St. Francis, Connecticut, Androscoggin, Kennebec, Penobscot, and St. John's. With an elliptic curve to the east, but a general northern course of 100 miles, it falls into St. Lawrence 6 miles above Quebec.

Geographically the Chaudiere valley stretches from N. lat. $45^{\circ} 25'$ to N. lat. $46^{\circ} 44'$, with long. 6° E. ranging over it longitudinally. It will not be necessary to repeat observations already made respecting the effect of climate on a tract of such rapid descent as the valley of the Chaudiere. I may merely observe, that independent of mountain ridges, it is probable that the table land from which the Connecticut and Chaudiere and neighbouring river have their sources, is the most elevated in t

United States, and if so, must exceed 2000 feet, or an elevation equivalent to five degrees of lat. It cannot, or it ought not, therefore, to excite surprise, to find the winters of upper Connecticut, and Maine, more rigorous than on the tide level of St. Lawrence, a degree of lat. more northward.

Below the Chaudiere, the right slope of St. Lawrence narrows rapidly, and about 120 miles below Quebec, or nearly opposite the mouth of Saguenai, is not above ten miles wide from the banks of the St. Lawrence to the northern sources of St. John's. Advancing still farther down the basin, its right slope widens, but never again spreads to 40 miles in breadth, and finally terminates at N. lat. $49^{\circ} 12'$, and long. $12^{\circ} 40' E.$

We may close our protracted view of the St. Lawrence basin by a brief survey of that part of the northern slope below the valley of the Ottawas. This extensive and imperfectly known region comprises a space of upwards of 700 miles from N. E. to S. W., with a mean width of at least 250 miles; area exceeding 175,000 square miles. As far as any dependence can be placed in our maps and on geographical analogy, the rivers of this tract exhibit in a very striking manner the lake character, and in proportion to length of course pour down into their recipient enormous volumes of water, flowing with excessive velocity. The principal of these rivers are St. Maurice above Quebec; and Saguenai, Betsiamitis, Breslard, and Black river, below that city.

The following account of the Saguenai, extracted from Bouchette's Canada, page 563-566, may serve to exhibit the character of the rivers of this rapidly inclining plain. I may premise that the respectability of Mr. Bouchette, and his ample means of correct information, preclude any suspicion of undue warmth of description.

"The river Saguenai, which discharges itself into

the St. Lawrence, at *Pointe aux Allouettes*, is the largest of all the streams that pay their tribute to the *Great river*. It draws its source from Lake St. John, a collection of water of considerable expanse, lying in N. lat. $48^{\circ} 20'$, long. $72^{\circ} 30' W.$, (W. C. between 4° and $5^{\circ} E.$) receiving many large rivers, that flow from the north and north-west, from an immense distance in the interior, of which, the *Picougamis*, the *Sable*, and *Pariboaca* are the principal. At its eastern extremity, (*Lake St. John*), two large streams, one called the *Great Discharge*, and the other the *Kinogami*, or *Land river*, issue from it; which after flowing about 57 miles, and encompassing a tract of land of the mean breadth of 12 miles, unite their waters, and become the irresistible *SAGUENAI*; from which point it continues its course in an easterly direction for about 100 miles down to the St. Lawrence. The banks of this river throughout its course are very rocky and immensely high, varying from 170 even to 340 yards above the stream. Its current is broad, deep, and uncommonly vehement. In some places where precipices intervene, there are falls from fifty to sixty feet in height, down which the whole volume of the stream rushes with indescribable fury and tremendous noise. The general breadth of the river is from two miles and a half to three miles, but at its mouth the distance is contracted to about one mile. The depth of this enormous stream is also extraordinary. At its discharge, attempts have been made to find its bottom with 500 fathoms of line (3000 feet) but without effect; about two miles higher up, it has been repeatedly sounded, from 130 to 140 fathoms; and from 60 to 70 miles from the St. Lawrence, its depth is found from 50 to 60 fathoms. The course of the river, notwithstanding its magnitude, is very *sinuous*, owing to many projecting points from each shore. The tide runs about 70 miles up it, and upon account of the obstructions occasioned by the nu-

merous promontories, the ebb is much later than in the St. Lawrence; in consequence of which, at low water in the latter, the force of the descending stream of the Saguenai is felt for several miles.

"Just within the mouth of the river, opposite to Pointe aux Allouettes, is the harbour of Tadousac, which is very well sheltered by the surrounding high lands, and has good anchorage for a great number of vessels of large size, where they may lie in perfect safety."

From the little that is distinctly known respecting the Betsiamitis, Breslard, and Black rivers, their features are strongly similar to those of Saguenai; but except near trading stations, and along the main streams, the rivers and lakes, and country they drain, towards Labrador continue a *Terra Incognita*. The great elevation, and an advance northward to 52° of lat., render the climate of those regions severely and permanently cold in winter. The highest civilized agricultural settlement that I have been made acquainted with on the continent of North America is that of Mingan, along the northern shore of St. Lawrence, opposite the island of Anticosti, and between N. lat. 50° and 51° . In all the immense interior tract of 1200 miles in length, equal to the distance from Maine to Georgia, or from the western coast of France to the sources of the Dnieper, all is yet silence and barbarism; but let it not be understood that these interminable regions are naturally sterile; for the fact is the contrary, and the day is rapidly advancing when science and civilization will take place of wilds and desolation. Let it be remembered that no unfavourable opinion is held respecting the soil and climate of Canada, but was once prevalent concerning similar objects in the United States.

We have thus passed cursorily over the great features of this very peculiar basin, and we may now in few words conclude our survey by a general sum-

mary. As a basin of inland commerce, it may be truly asserted that the St. Lawrence stands alone on the globe. The sublime and boldly sketched features of that vast and unequalled assemblage of fresh water lakes demand more than ordinary attention from the geographer and statistical enquirer. In its main channel, that of the St. Lawrence, we have found the ocean tides penetrating to 432 miles, or about midway between Quebec and Montreal; Above tide water to Ogdensburg, the channel is much impeded by shoals and rapids, but in no place actually impassable with vessels, either ascending or descending. Ships of the line, of the first class, are navigated to Quebec, and those of 600 tons to Montreal, upwards of 500 miles from the Gulf of St. Lawrence.

But again passing from St. Lawrence we merge into an inland sea, already rendered classical from contending fleets. At the lower extremity of the first expanse of that central sea, Ontario, two harbours present their deep recesses to the most unwieldy vessels of war; these are Kingston and Sackett's. Beyond those spacious havens the harbours of the Canadian sea are generally shallow, but no region of the earth presents such varied, contrasted, and peculiar scenery. Even the mighty Niagara is but the principal object of interest on this expanded canvass. Without ascending above Buffalo, it may be doubted whether any other equal distance can afford more to arrest the admiration of the traveller than the space from Lake Erie to the city of Quebec.

Than the Thousand Islands, a scene can no where be found more savage, rude, and wild. The placid and limpid water reflects the broken rocks, and the few trees and shrubs which rise amid the fissures of their fractured ruins. No human habitation appears to enliven for an instant this picture of eternal waste; but passing this scene of silent and magnificent de-

solation, a fairy land seems to open. Where the Thousand Islands terminate at Brockville, the river dilates into a small bay, and farther down slowly contracts; the shore on both sides rising by a regular and gentle acclivity, exposes a landscape which for placid beauty cannot be excelled. This is the general character of the main banks until far below Montreal. Four miles below Ogdensburg a group of islands, the Galloupe, commences, but with a physiognomy entirely distinct from the naked rocks of the Thousand Islands. The Galloupe cluster exceeds thirty in number, and lying with every inclination to the general course of the river, and varying in size from $1\frac{1}{2}$ miles to 20 yards in length; almost all of an elliptical form, and rising from the water by a globular swell. In the bland air of a Canadian summer evening the imagination can scarcely conceive any spots more delightful than those isles. On many which have been formerly cleared of timber and again overgrown with ash, linden, wild cherry, and aspen trees without underwood, it is a real recreation to contemplate the enchanting prospect, the cultivated shores, the floating barks, and the majestic river whose overpowering volume is spread around.

Proceeding downwards a constant succession of natural objects meet the traveller's eye; objects commensurate in their outline to the scale of the basin in which they are placed.

Below Montreal, the country adjacent to the river becomes less elevated, and of course the scenery less bold and striking, and this character of coast continues to near the head of the tides at the mouth of St. Maurice; but, here again the banks resume all their varied splendour of contrasted beauty, and rise on both sides to the height of Cape Diamond, on which Quebec is placed. "At this capital of the province," says Bouchette, "there is a most excellent port and a capacious basin, wherein the great

est depth of water is 28 fathoms, with a tide rising from 17 to 18 feet, and at the springs from 23 to 24 feet. From whence, and from Point Levi on the south shore, one of the most striking panoramic views, perhaps, in the whole world, offers itself to notice. The assemblage of objects is so grand, and though naturally, yet appear so artificially contrasted with each other, that they mingle surprise with the gratification of every beholder. The Capital on the summit of the cape, the river St. Charles flowing for a great distance through a valley abounding in natural beauties, the falls of Montmorenci, the island of Orleans, and the well cultivated settlements on all sides, form together a *couch d'œil* that might enter into competition with the most romantic."

This grandeur in the face of nature remains undiminished if not increased below Quebec. At Rivière du Sad, 30 miles lower than the capital, the river is 11 miles wide, and the white churches, hamlets, villages, and farms, protruded on the vision by the dark and thick woods, and the strongly defined back-ground of lofty mountains, maintain the pre-eminence of landscape along the St. Lawrence.

It is not, however, in summer alone, or in autumn, that the St. Lawrence basin can be seen to most advantage. In all the rigors of a Canadian winter, when the capacious bosom of most of its rivers are turned into solid and glassy roads, and in the vicinity of Quebec this change is annual, then the more intense and continued the frost, the more pertinaciously do the inhabitants boast of their season of business, amusement, and pleasure. If frost and snow do not altogether compensate to the Canadian the open navigation of summer, the long and unbroken frozen surface of Lower Canada, renders winter in that country certainly preferable to the same season in the middle states of the United States, and the southern part of Upper Canada.

Excessive tides prevent the St. Lawrence ever becoming covered with compact ice, below Quebec, but such are the enormous masses driven in every direction by the winds and currents, that the river is utterly unnavigable nearly half the year. It is then amid snow and ice that gliding vehicles supply the place of sails, oars, and wheels, and the smooth faces of the streams are transformed into most excellent roads, and the Canadian, shut from the ocean, performs his rapid journey of business or social intercourse.

In fine, at any season of the year, if taken as a whole, I cannot conceive of a more pleasing region than the St. Lawrence basin; nor of any part of the earth where nature has engrouped more to gratify the traveller or the natural philosopher,—and I might say the statesman, for here is a powerful nation in its cradle.

No XV.—Table of the extent and geographical position of the basins of the Atlantic slope, from Florida Point, to the mouth of St. Lawrence river.

BASIN.	Length	Mean Breadth	Area.	Between latitudes.		Between longitudes from Washington City.	
St. John's of Florida	120	40	4,800	28°15'	30°19'	4°12'	5°30' W.
St. Mary's and Nassau	60	35	2,100	30 06	31 05	4 31	5 40 W.
St. Illa	140	30	4,200	30 50	31 51	4 30	6 25 W.
Alatamaha	250	50	12,500	31 15	34 28	4 22	7 20 W.
Ogeeche	160	30	4,800	31 42	33 36	4 02	6 05 W.
Savannah	250	40	10,000	31 49	35 08	3 52	6 45 W.
Port Royal	70	10	700	32 12	33 00	3 41	4 15 W.
St. Helena and Edisto	120	40	4,800	32 23	33 52	3 24	4 42 W.
Charleston	30	30	900	32 40	33 20	2 42	3 20 W.
Santee.	250	40	10,000	33 05	36 03	2 12	5 45 W.
Winyaw, or Pedee	250	70	17,500	33 10	36 35	2 10	4 40 W.
Cape Fear	200	40	8,000	34 00	36 20	38	3 08 W.
Onslow	30	30	900	34 30	35 00	0 00	0 50 W.
Pamlico	150	50	7,500	34 48	36 20	1 30 E.	2 18 W.
Albemarle, or Roanoke	300	60	18,000	35 28	37 28	1 20 E.	3 40 W.
James river	250	40	10,000	36 40	38 20	1 00 E.	3 40 W.

TABLE No. XV.—Continued.

	150	60	9,000	43°40'	46°12'	5°45' to	7°50' E.
Kennebec	120	60	7,200	43 53	45 12	6 36	9 10 E.
Penobscot	90	30	2,700	44 00	45 00	8 20	10 00 E.
Union, Machias, &c.	55	30	1,650	44 45	45 50	8 45	10 00 E.
St. Croix	240	80	19,200	45 15	48 00	6 40	11 40 E.
St. John's	210	75	15,750	43 30	45 45	10 50	16 00 E.
Nova Scotia, peninsula of	150	35	5,250	45 30	47 05	15 30	17 20 E.
Cape Breton	90	25	2,250	46 00	47 12	12 30	15 20 E.
Prince Edward	90	25	2,250	45 25	46 20	12 30	14 20 E.
Isthmus of Fundy	220	50	11,000	46 00	48 30	9 00	12 30 E.
Eastern Slope of N. Brunswick							
Total	1900	162	308,600	28 15	48 30	7 20 W.	17 20 E.

In a geographical point of view the Great Basin of St. Lawrence is also a part of the Atlantic slope; I shall therefore give a table in connexion with the former.

No. XVI.—*Table of the Area of the St. Lawrence Basin by the Rhumbs.*

SECTION.	No. of Rhumbs.	Area in square miles.	Between Latitudes.		Between Longitudes.	
South from Lake Erie and Michigan	1	3,686	40°	41°	4° 40'	8° 00' W.
Chiefly between do.	6	21,780	41	42	3 00	10 30 W.
Along the upper St. Lawrence, on the	11	39,325	42	43	11 40 W.	1 30 E.
peninsulas between lakes Ontario, Erie,	14	49,224	43	44	12 10 W.	2 30 E.
Huron and Michigan, and west from the	17	58,752	44	45	12 10 W.	5 15 E.
latter; and partly in the United States,	20	67,940	45	46	15 10 W.	6 40 E.
and partly in the British territories.	23	76,728	46	47	17 12 W.	7 10 E.
On the lower part of the Basin, on the	25	81,875	47	48	17 00 W.	8 30 E.
northern confuence of the St. Lawrence,	10	32,140	48	49	15 00 W.	12 20 E.
and around lake Superior. Only	9	28,323	49	50	14 00 W.	10 40 E.
a minor part of these Rhumbs fall with-	12	36,792	50	51	12 30 W.	13 15 E.
in the United States.	6	18,096	51	52	3 00 to	12 40 E.
		514,661				

Table 16, will at a single glance correct a common error; that is, in giving a uniform climate to Canada. The mouth of the St. Lawrence, is traversed obliquely by the 49th curve of latitude, whilst the southern part of Upper Canada, at the mouth of Detroit river, is very little above 42°, differing 7° of lat. The whole basin it will be perceived stretches through the extremes of 11°. If the several subdivisions of the St. Lawrence basin are taken separately, and their respective extent given in round numbers, the results are as follows:

TABLE No. XV.—Continued.

	150	60	9,000	43°40'	46°12'	5°45' to	7°50' E.
Kennebec	120	60	7,200	43 53	46 12	6 36	9 10 E.
Penobscot	90	30	2,700	44 00	45 00	8 20	10 00 E.
Union, Machias, &c.	55	30	1,650	44 45	45 50	8 45	10 00 E.
St. Croix	240	80	19,200	45 15	48 00	6 40	11 40 E.
St. John's	210	75	15,750	43 30	45 45	10 50	16 00 E.
Nova Scotia, peninsula of	150	35	5,250	45 30	47 05	15 30	17 20 E.
Cape Breton	90	25	2,250	46 00	47 12	12 30	15 20 E.
Prince Edward	90	25	2,250	45 25	46 20	12 30	14 20 E.
Isthmus of Fundy	220	50	11,000	46 00	48 30	9 00	12 30 E.
Eastern Slope of N. Brunswick							
Total	1900	162	308,600	28 15	48 30	7 20 W.	17 20 E.

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SECTION.	No. of Rhumbs.	Area in square miles.	Between Latitudes.		Between Longitudes.	
			40°	41°	4°40'	8°00' W.
South from Lake Erie and Michigan	1	3,686		41°	3 00	10 30 W.
Chiefly between do. do.	6	21,780	41	42		1 30 E.
Along the upper St. Lawrence, on the	11	39,325	42	43	11 40 W.	2 30 E.
peninsulas between lakes Ontario, Erie,	14	49,224	43	44	12 10 W.	5 15 E.
Huron and Michigan, and west from the	17	58,752	44	45	12 10 W.	6 40 E.
latter; and partly in the United States,	20	67,940	45	46	15 10 W.	7 10 E.
and partly in the British territories.	23	76,728	46	47	17 12 W.	8 30 E.
On the lower part of the Basin, on the	25	81,875	47	48	17 00 W.	12 20 E.
northern confluence of the St. Lawrence,	10	32,140	48	49	15 00 W.	10 40 E.
and around lake Superior. Only	9	28,323	49	50	14 00 W.	13 15 E.
a minor part of these Rhumbs fall with-	12	36,792	50	51	12 30 W.	12 40 E.
in the United States.	6	18,096	51	52	3 00 to	
		514,661				

Table 16, will at a single glance correct a common error; that is, in giving a uniform climate to Canada. The mouth of the St. Lawrence, is traversed obliquely by the 49th curve of latitude, whilst the southern part of Upper Canada, at the mouth of Detroit river, is very little above 42°, differing 7° of lat. The whole basin it will be perceived stretches through the extremes of 11°. If the several subdivisions of the St. Lawrence basin are taken separately, and their respective extent given in round numbers, the results are as follows:

No. XVII.—*Table of the geographical position and extent in square miles of the sections of the St. Lawrence basin.*

NATURAL SECTION.		Mean Length.	Mean Breadth.	Area in square miles.
Region lying N. W. from lake Superior	.	300	80	24,000
Region lying N. E. from lake Superior	.	400	80	32,000
Region lying N. from lake Huron, and W. from the sources of Ottawa river.	.	200	200	40,000
Peninsula between lakes Ontario, Huron and Erie	.	200	80	16,000
Region N. W. from the St. Lawrence and below Ottawa river	.	700	250	175,000
Region S. E. from the St. Lawrence, below Richelieu river	.	500	50	25,000
Triangle, included between the rivers Black, St. Lawrence, and Richelieu	.	250	50	16,500
South from lake Ontario, and W. from Black river	.	200	80	16,000
S. E. and S. from lake Erie and E. from Maumee river	.	300	30	9,000
Peninsula of Michigan	.	250	150	37,500
W. from lake Michigan, and South from lake Superior	.	400	120	48,000
W. Total area of St. Lawrence basin by the natural sections, exclusive of the lakes				439,000
Lake Superior	.	300	80	24,000
Lake Huron	.	200	95	19,000
Lake Michigan	.	300	50	15,000
Lake Erie	.	230	35	8,030
Lake Ontario	.	180	30	5,400
Lake Lawrence and smaller lakes	.			1,500
St. Total water surface in St. Lawrence basin	.			72,930
Aggregate area of Land and Water in St. Lawrence basin	.			511,930

No. XVIII.—Summary of the Atlantic Slope of North America, including the Basin of St. Lawrence.

NATURAL SECTION.	Length	Mean Breadth	Area.	Between latitudes		Between longitudes	
S. W. part of Atlantic Slope, from Florida Point to Neuse Basin inclusive	780	104	81,200	24°15'	36°20'	7°20' W.	1°30' E.
Middle Section of Atlantic Slope from Pamptico Basin to Buzzard's Bay inclusive	760	186	141,380	35 28	45 12	3 40 W.	7 07 E.
N. E. part of Atlantic Slope, from Massachusetts Bay to Chaleur Bay inclusive	500	172	86,020	41 40	48 30	5 38 to	17 20 E.
Total of the St. Lawrence Basin.			511,930	40 18	52 00	17 00 W.	13 00 E.
Total of the Atlantic Slope	2000	410	820,530	24 15	52 00	17 20 E.	17 00 W.

The reader will observe that the areas in the preceding tables Nos. 15, 16, and 17, are expressed generally in round numbers, and that in some instances more is taken into the expression than would strictly be included, as in the case of Massachusetts Bay, in which Cape Cod is comprised. This was done to avoid the omission of large fractions, and to limit as far as possible the specific sections.

CHAPTER VIII.

GEOGRAPHICAL VIEW OF THE RIVER BASINS OF
THE UNITED STATES, CONTIGUOUS TO THE
DELTA OF THE MISSISSIPPI.

WIDELY extended as are the united regions included in the Atlantic slope of North America, and the basin of St. Lawrence, we now enter on another basin, that of the Mississippi, more extensive than the two former taken together. I have already shewn that the Mississippi and its confluent present features so totally different that nothing but contrast can be drawn between them and the St. Lawrence. In passing from one basin to the other a new world opens to the traveller; the face of nature is changed; the objects are distinct in species, almost in genera, and it is difficult to conceive ourselves on the same continent, and on a region contiguous to that from which we have departed.

In respect to the distinctive feature of lakes so immense in one basin, and almost unknown in the other, it may not be irrelevant to observe that we are sometimes deceived by too greatly restricting terms. "Before reaching Montreal," says Mr. Bouchette, when speaking of the St. Lawrence, "the lakes St. Francis, St. Louis, and des Montagnes, present themselves: they do not admit of comparison with those already noticed, and can, indeed, only be considered as so many widenings of the river."

To this it may be replied, that if the first springs which afterwards form the rivers west of Lake Superior are taken into the account, then is that great

body of water itself only a dilatation of the channel, as the streams are aggregated in descending from their original source. Lakes Huron, Erie, Michigan, and Ontario, and even Lake Superior, differ in nothing but extent, comparatively, from those of St. Francis and St. Louis in the St. Lawrence; from Lakes George and Champlain in the Richelieu; from Cassina and Pepin in the Mississippi; or from Lake Lemane in the Rhone. The smallest brook presents all the features of the largest river. Where the plain has too little declination to admit direct descent, a pond or lake is formed; and again, where the descent becomes rapid, a flowing stream is the effect, and an effect in direct excess in proportion to the actual declination of the plain.

From such simple principles arise all the variety of feature conceivable, from the smallest pool to the expanded bosom of Lake Superior; and from the slowest perceptible current to the most impetuous cataract. On these sound data depends the philosophy of rivers. Closely examined, all streams, whatever may be their size, will be found composed of chains, whose links are themselves alternately lakes and cataracts, but it is the excess in the dilatations of the St. Lawrence, and their moderate extent in the Mississippi, which so strongly contrast those two great rivers.

On true geographical principles, the Mississippi basin, vast as it is, can only be considered as a section of that system of rivers which flow into the Gulf of Mexico, and regard that inland sea as their common recipient. It is very remarkable that if every stream, great and small, which enters this gulf, from Cape Sable of Florida to Point Gorda of Yucatan, were supposed to be continued in the line of their course, they would unite with each other in a common estuary, not far outside of the centre of the gulf. But from the great superiority in quantity of water and of surface drained by the Mississippi,

that river well deserves to give name to the system of which it forms so conspicuous a part. I, therefore, in proceeding to sketch the great central basin, include with the Mississippi those minor rivers which enter the Gulf of Mexico in the United States.

If we examine a map of North America, we at once perceive that the great basin of the Mississippi is really only a part of a much more extensive depression, which has its oceanic termination S. in the Gulf of Mexico, and N. in Hudson's bay. This great central valley of the continent rises from the actual channel of the lower Mississippi by two unequal inclined planes; the eastern plane, having its highest line of elevation in the dividing ridge between the Atlantic and Mississippi sources; whilst on the west, the opposing plane rises by a much slower acclivity to the line of separation between the western confluent of the Mississippi and those of the Pacific ocean.

The Appalachian system does not constitute the dividing ridge between the rivers which flow from or towards its vallies; and, from what we actually know concerning the Chippewayan system, there are strong reasons to believe that similar to the Appalachian, the range of the chains of the former is oblique to that of its river vallies.

When treating of the St. Lawrence basin, it has been seen that no particular elevation of either mountain or hills, serves to form a demarcation between its southern sources and those of the Mississippi; on the contrary, the waters of southern Michigan are at some seasons, nearly on a level, and mingle with those of Illinois, flowing into the Mississippi. The preceding remark may be farther extended, and applied to the immense inflected line, of upwards of two thousand miles, from the sources of the Susquehanna, Genessee, and Allegany, to those of Saskatchewan of Hudson's bay, Maria's river of Missouri, and Clark's river of Columbia. The latter line may be

considered as that by which the slope of the Mississippi basin declines from those of the St. Lawrence and Hudson basins, and entirely destitute of mountains, though exceeding in length the curve line of Europe, extending from the Carpathian to the Ural systems, and which separates the sources of the streams which flow into the Black and Caspian, from those which enter the Baltic and White seas.

We may therefore consider the basin of the Mississippi as the southern declination of the great central valley of North America ; and as limited east, by the table land, and not by the actual chains of the Appalachian system, and on the west, in a similar manner, terminated by the table land, and not by the chains of the Chippewayan.

On the northern boundary, the actual separation of source is in many places undefined by nature, and the summit level so completely a part of the surface of a sphere, that the waters flow both ways. This circumstance we have found to be the case near the southern termination of Michigan lake, and between St. Louis river of lake Superior and the Ouisconsin branch of Mississippi. It is evident from the preceding data that lake Michigan, Illinois river, and the Mississippi river below the mouth of the Illinois, are parts of the lower depression of the central valley of North America, and that a barrier of very little elevation above Niagara, would turn the entire discharge of the higher sub-basin of the St. Lawrence into the Illinois, and of course into the basin of the Mississippi. This has been supposed by some observers to have been the case; a more correct geographical knowledge may yet decide this curious problem in physical geography.* In the existing state of things

* Might not lake Erie have formerly discharged itself by the Tonnewanta valley, into the Genessee river? It is, however, believed by some that this lake formerly discharged itself by the Chicago creek and Illinois rivers into

it will demand comparatively but a limited exertion of human power to open an uninterrupted water communication between lake Michigan and Illinois river, and insulate all that part of the territory of the United States, and adjacent parts of Cabotia, which are included between the St. Lawrence basin, the Atlantic ocean, Gulf of Mexico, and Mississippi river.

The great surface included under this head, the imperfect state of geographical knowledge respecting many of its sections, and the brevity of this view, all combine to preclude so detailed a notice of the minor parts, as has been given in respect to the Atlantic slope; but there are peculiarities in the periodical fluctuations of the rivers of the central basin which demand the more attention because the laws which govern the annual overflow of the main recipient are but imperfectly understood.

The most south-western stream of the United States is the Sabine. This river has its source in the province of Texas, about N. lat. $32^{\circ} 30'$. With an elliptical curve to the east, the general course of the Sabine is nearly south. At N. lat. $30^{\circ} 10'$, it emerges from a dense forest into open plains of grass and marsh, through which it flows by an excessively winding channel, to N. lat. 30° , where it dilates into a shallow lake of 30 miles in length, and from three to five miles wide; which, at its lower extremity, again contracts into a river of about 200 yards wide, and discharges into the Gulf of Mexico at N. lat. $29^{\circ} 28'$, long. W. C. $17^{\circ} 05' W$. The country from which the sources of Sabine arise is rolling or rather moderately hilly, but eminences of every kind subside as the stream quits the forest, and in

the gulf of Mexico, before the supposed barrier at Lewiston was broken down.—*Clinton's Introductory Discourse before the L. & P. S., N. Y.*, note 7, p. 51. David Longworth, 1815.

the prairies and marshes towards the sea coast, one undeviating level spreads its monotonous bosom.

This river affords no navigable facility worthy notice ; it has not in ordinary tides above three feet water on its bar, nor has its inland lake or bay above four or five feet, and near the shores still less depth. I navigated it with three assistants in a large pirogue, drawing about one foot water, and was very seldom able to reach the shore without dragging our slight vessel.

The Calcasieu is the next stream which follows the Sabine to the eastward. The former rises in the angle between the latter and Red river, at N. lat. $31^{\circ} 30'$. Curving in a singular manner alike, the Sabine and Calcasieu, from the sources of the latter to its mouth, flow very nearly parallel to each other, distant about 35 miles; and similar in their features, the latter, like the former, emerges from the same forest into open prairies and marshes, expands into a lake, and again contracts into a river before reaching the Gulf of Mexico, into which it is discharged at N. lat. $29^{\circ} 32'$, long. $16^{\circ} 23' W.$ The resemblance between the two rivers is extended to their respective rank as navigable channels ; the depth either on the outer bar or lakes, is remarkably similar.

Following the coast of the Gulf of Mexico about twelve miles eastward from the mouth of Calcasieu, is found that of the Mermentau. The triangle made by the Delta of the Mississippi, the shores of the Gulf, and the Sabine, has its base along the Gulf, perpendicular along the Sabine, and hypothenuse along the Delta, and consequently, the rivers rising on the triangle have more contracted courses, advancing from the basin of the Sabine towards the outlet of the Mississippi. The Mermentau is truly a river of Opelousas prairies, rising on the triangle we have sketched, at N. lat. $30^{\circ} 53'$, and, draining the centre of Opelousas by a number of branches,

flows by a general course of S. S. W., opens like the Sabine and Calcasiu, into a lake, and again contracts into a river, which falls into the Gulf of Mexico at N. lat. $29^{\circ} 32'$, long. $16^{\circ} W$. With other traits of resemblance, the Mermentau partakes with the Sabine and Calcasiu in a defective navigation.

Those three streams are so perfectly similar, and so nearly of a width at their respective mouths, that it is difficult to distinguish them asunder. There is, however, one certain landmark to point out the Mermentau from the two others. The live-oak, *Quercus sempervirens*, is plentiful in small clusters along its shores, and in little clumps spread over the adjacent marshes; but upon the Calcasiu and Sabine this tree is utterly wanting. This fact in vegetable physiology, I can vouch from actual observation. When I entered the Calcasiu, I thought myself in the Mermentau, and looked in vain for the live-oak tree, which I had previously and truly been told abounded near the latter. In a careful examination along both the Sabine and Calcasiu I did not detect a single stem of this valuable tree, so very plentiful on those streams more eastward. The cause of this phenomenon may be accounted for by due attention to the elements in Chapter X. of this view.

From the outlet of the Mermentau, a distance of about 60 miles is altogether unbroken by a single stream originating in the solid prairie and crossing the marsh. This inaccessible line of coast is followed by the Vermillion, a fine, but small river, rising in Opelousas, but flowing through Attacapas into the Gulf of Mexico. The source of the Vermillion is near the village of St. Landre, the seat of justice of Opelousas, at N. lat. $30^{\circ} 31'$, and with a general southern course of about 80 miles, falls into a large bay, which again opens by several passes into the Gulf of Mexico at N. lat. $29^{\circ} 35'$. Though something more navigable than the small rivers we

have already noticed as entering the Mexican gulf west of that stream, the Vermillion will not admit vessels of above 5 feet draught. The lands along its banks above the sea marsh are of excellent quality, and as low as the 30th degree of N. lat. produce sugar cane; cotton is, however, the staple commodity generally cultivated.

The Teche, a stream of superior magnitude and length of course to the Vermillion, heads in the same part of Opelousas, but as the latter mingles with the Atchafalaya, the Delta of the Mississippi succeeds to the former.

The Atchafalaya* is the upper mouth of the Mississippi on the right, and leaves the main stream at N. lat. 31°, long. 14° 47' W. Where this outlet leaves the Mississippi, the latter is a fraction above half a mile wide, and the former 110 yards. It is only in seasons of high water that a heavy volume flows down the Atchafalaya. I have seen the current in fact flowing out of that channel into the Mississippi, but when the latter is at its extreme height, the mass of water drawn down this great outlet is enormous, and for five or six miles, the current is excessively strong, but abates as the river approaches the interior overflowed plains. I have denominated this inundated tract "plains," to distinguish it from the sea marsh. These two kinds of soil, though contiguous in Louisiana, and in many other parts of the sea border of the United States, are radically distinct. The periodically inundated tracts along the Mississippi, are also very erroneously called *swamps*. So far from being swamps,

* A-tcha-fa-lay-a, as the Indians pronounce this word, giving each syllable with equal accent, and with the sharp *a*, as in bat. It is in fact a sentence signifying "*Lost water*," and when properly pronounced is an elegant, and when understood, a very descriptive name.

in the true meaning of that term, the low and flat lands submerged annually by the surplus waters of this immense river, are, when left dry for some weeks, excessively solid land, and in a state of nature, covered with very dense forests. In point of soil the high prairies are similar to the inundated and wooded lowlands; but the marshes near the sea, still more uniform in their surface than either the high prairie or inundated forest land, are liable to diurnal flow of the tides, and are real swamps, and, except by the streams, utterly impassable by man.

The Atchafalaya in its course, and including its confluent, drains within a comparatively confined area a very great variety of soil and surface. After leaving the Mississippi, this stream flows south-west 5 miles, and thence turns to south, which latter course, with great partial windings, is maintained 30 miles, to the influx from the north-west of the Courtableau.

The Courtableau is a singular stream; its two remote sources, the Crocodile and Boeuf, rise in the hilly pine forests, between Red river and the head of Calcasieu, about N. lat. $31^{\circ} 20'$. Flowing south-east, and nearly parallel, 65 miles, they unite about 8 miles a little east of north from the village of St. Landré. The lower part of the channel of the Crocodile passes along the verge of the prairies of Opelousas, whilst its confluent, the Boeuf, ranges along the western margin of the great forest-overflow of Red and Atchafalaya rivers; below their junction the united stream, under the name of Courtableau, maintains the original course of south-east 20 miles to its junction with the Atchafalaya. Within 5 or 6 miles from St. Landré, this really important though humble stream, opens a glimpse of the wide spread prairies, and again plunges into the deeply entangled woods whose roots are annually bathed with the waters of the Mississippi. The Courtableau is the

channel of intercommunication between the higher parts of Opelousas and the Mississippi.

Below the Courtableau, the Atchafalaya, through a maze of interlocking outlets and inlets, turns to S. S. E. about 20 miles, to the outlet into Lake Chetimaches. Turning thence nearly due east 15 miles, receives the Plaquemine outlet from the Mississippi.

The Plaquemine is one of the mouths of the Mississippi, and except in size, is otherwise of the same nature with the Atchafalaya itself. The former issues from the main stream about 20 miles below Baton Rouge, and 6 below the Iberville. It is only at high flood that any water flows into the Plaquemine; the channel is narrow and the current excessively rapid, but, similar to that of the outlet of the Atchafalaya, mitigates approaching the interior low grounds, and becomes moderate near its junction with the latter, six miles in a direct line from the Mississippi.

Having received the Plaquemine, the Atchafalaya winds to a little east of south, 30 miles to its ingress into a large bay of the same name. At 20 miles above its mouth the Teche enters from the north-west.

The Teche rises in the northern prairies of Opelousas, at N. lat. $30^{\circ} 40'$, and flowing south-east 30 miles, between the Courtableau and Vermillion, enters Attacapas. At the point of entrance into the latter, an inlet from the Vermillion unites with it, below which the Teche assumes the form of a river, and continuing S. E. 30 miles to New Iberia, meets the tide at N. lat. $30^{\circ} 02'$, and inflecting to S. E. by E. widens from about 30 to 100 yards, and deepens from 5 to 30 or 40 feet, and flowing 90 miles, joins the Atchafalaya.

The entire length of the Teche, by comparative courses, is about 150 miles, but following the windings of the stream at least 200; but a circumstance

of peculiar interest in the geography of this river is the fact, that in all its range in Attacapas, of upwards of 120 miles comparative course, it receives no tributary branch. The banks rise by gentle acclivity, to 35 or 40 feet, and decline from the water 40 or 50 yards, and similar to those of the Mississippi, rise above the adjacent plains, and have every appearance of having once been overflowed periodically, and of having contained a much larger volume of water than now passes down the channel at any season of the year. If a map of the country drained by the Teche was drawn without that stream and presented to a person unacquainted with its individual geography, he would place a dividing ridge precisely along its channel; such, however, is the intricacy of the topography of the western part of the Delta of the Mississippi, that I have inserted the enclosed sketch, in order to compensate for the defect of verbal description. The real distinction between the prairie, sea-marsh, and inundated forest land, is also exhibited. The Atchafalaya is, however, drawn on a much too large comparative scale with the Mississippi.

New Iberia, at the head of tide water in the Teche, is a port of entry, and vessels frequently clear out from thence, but the general commercial communication is with the city of New Orleans, through the Atchafalaya, Plaquemine and Mississippi; or from the lower Teche, through lakes Palourde and Veret and their connecting inlets, and the Lafourche and Mississippi rivers.

Boats from 15 to 60 tons are conveyed from New Orleans by the Plaquemine into the Atchafalaya. Those destined for the lower part of Attacapas descend the latter river, and enter their points of destination by the Teche. Those bound to the central parts of Attacapas, ascend the Atchafalaya about 20 miles, and are thence transported by an outlet and Lake Chetemaches, to the Fause Point landing.

Here is a portage of 10 or 12 miles to St. Martinsville, seat of justice for the parish of St. Martins, or Upper Attacapas. Vessels destined for the higher and central parts of Opelousas ascend the Atchafalaya to the mouth of Courtableau, and thence by the latter stream to Lemell's Landing, 6 miles, or into Bayou Carron, 4 miles from the village of St. Landré.

The much misunderstood phenomenon in the Atchafalaya, "*The Raft*," is in reality the *debris* thrown out of the Mississippi, which at some unknown period was collected in a mass at one of the abrupt bends in the narrow and very tortuous channel of the Atchafalaya, and augmented by future accessions of floating timber, obstructed the navigation between the points marked on the accompanying sketch. I surveyed the Atchafalaya from its outlet from the Mississippi to its junction with Plaquemine, and examined the coast, in 1808, 1809, and 1810. At those epocha, the Raft began about 26 miles by the channel from the Mississippi, and occurred in fragments as low as within 5 miles above the Courtableau. About 1774, a small mass broke from the main body, and lodged again about half a mile below the mouth of Courtableau, and continues yet to embarrass the navigation of both streams, though partially removed by the inhabitants of Opelousas.

The Raft is by no means stationary; several breaks were made by the rising waters in my own presence; but interlaced as the trees are by their branches and pressure, when a breach does occur, it is by immense masses, which soon again lodge. The channel varies very little from about 110 yards wide from the Mississippi to the Teche, and above the Courtableau the bends are extremely abrupt and winding, presenting in reality a miniature picture of the Mississippi.

The ordinary tides of the Gulf of Mexico are so

much influenced by variable winds, that the flow inland cannot be marked to any given point in most of the channels of Louisiana; but left to its own natural swell, the spring tides, when the interior waters are low, ascend in the Atchafalaya above the lower Raft, and in the Courtableau, to near the lower Opelousas landing. In the Plaquemine and Iberville, the spring tides, in the foregoing stated condition of the rivers, rise to within 4 or 5 miles from the Mississippi. I particularly notice these circumstances in the tides, as they tend so strongly to illustrate the real and relative elevation of this country. The spring tides of the Gulf of Mexico, unaided by wind, do not exceed 3 feet, and consequently from the approach of the earth in and near the Delta of the Mississippi to the curve of the sphere, a rise so moderate is perceptible to a distance inland, which from a superficial view of the external features, would be totally unexpected. Similar inductions may again be drawn from the rise of the tide in the Teche, Vermillion, and the branches of Mermen-tau; and I have no doubt also in the Calcasieu and Sabine, but when I examined the two latter rivers, they were greatly swollen by winter rains, and north and north-west winds prevailed nearly the whole period of my visit to their channels. The other rivers from which my examples have been drawn, I had repeated opportunities to examine leisurely at nearly all seasons of the year.

I may dismiss the subject of the Atchafalaya, by observing that the surface on both sides of its channel is the lowest ground, the sea marshes excepted, in the Delta, and with very partial exceptions, is liable to annual and deep submersion. The reader ought, however, to cautiously distinguish between the relative elevation of the surface near the rivers, and the actual bottom of the streams. It will be shewn in the sequel, that the channel of the *Mississippi* is the lowest valley of the country through

which it flows, but it is evident, from the enclosed sketch, that the surplus water which *falls*, if I may be permitted the expression, out of the surcharged channel of the main stream, is carried with great velocity backwards towards the deep recesses of the overflowed lands near the Atchafalaya. The overflow of the latter is again slightly, and but slightly, augmented by the Raft. As the timber rises and falls with the flood in the river, it cannot greatly impede the descent of the water. In fact the most operative cause of the annual inundation of the Delta, is evident from the data given to be the very little inclination of the plain from the interior towards the sea. The water therefore accumulates in the Atchafalaya valley, and if the forest was removed would give to that region in the time of inundation the aspect of a lake.

Another powerful cause of inundation in the Atchafalaya valley is, that a line of comparative high alluvial land is protruded to the latter river by the Teche, and with the mere intervention of the main channel, is met by another alluvial line of a similar nature from the La Fourche. Thus the whole body of water drained in spring floods from the Mississippi by the Atchafalaya, and which is also brought down by the Courtableau, Teche, and small streams from Opelousas and Attacapas, can only escape by the former, opposite the mouth of the Teche.

It may be asked, how high does the tide rise on the Mississippi itself? Such is the weight of volume of water in the channel of the Mississippi even when lowest, that the tide has never been known to ascend to New Orleans, though perceptible near that river far above that city. The cause of this apparent anomaly is, that the surface of water in the Mississippi, at its most depressed stage, rises above that of the lakes and rivers in its vicinity.

Advancing eastward from the Atchafalaya along the shores of the Mexican Gulf, the La Fourche is the first inlet of consequence in a commercial point of view. In the intermediate distance of 60 miles, several small streams enter the Gulf, but from their very abridged length of course, are unimportant.

The La Fourche (*the fork*), as its name imports, is a mouth of the Mississippi, similar to the Atchafalaya, Iberville, and Plaquemine, and the third on the right in descending. The outlet of the La Fourche, 40 or 50 yards wide, is at N. lat. $30^{\circ} 06'$, long. $14^{\circ} 01' W$. After leaving the Mississippi, the course of the La Fourche is S. E. by S. 90 miles, to its egress into the Gulf of Mexico, at N. lat. $29^{\circ} 05'$, long. $13^{\circ} 30' W$. The La Fourche is one of the most important inlets of Louisiana, having 9 feet water on its bar, and admitting vessels drawing 4 or 5 feet to within 30 miles of its efflux; but contrary to those of the Atchafalaya, the banks of the La Fourche are high and arable for a distance of 60 or 70 miles from the Mississippi. Cotton and sugar are the principal staples. Much of the produce and merchandize of the settlements along its banks are transported to and from New Orleans by the Mississippi.

From the Sabine to the Vermillion, the coast of Louisiana stretches a very little north of east, but at the Vermillion outlet bends to S. E. by E. upwards of 100 miles, forming an obtuse cape which reaches to near the 29th degree of latitude. The interior of this cape is formed by the high lands between the Atchafalaya and La Fourche, and by the high alluvial banks of the latter. I call those embankments high land, it may be noticed, by mere comparison with surface still lower, and subject to annual inundation. In the present case, the alluvial lines being above any except very extraordinary inundations, *shelter a triangular body of land, now forming the*

parish of Terre Bonne. In this new parish, a number of small rivers or bayous rise, and flow southward into the Gulf of Mexico. Not being liable to the inroads of the Mississippi overflow, the banks are arable, though no one of their channels is of such width and depth as to admit vessels of any draught worthy of observation in a navigable point of view. It is the most southern tract of cultivatable soil in Louisiana of any considerable area, and will, on every spot which admits agricultural operations, produce sugar cane and rice. Here exists the only prairie, in the real meaning of that term, to be found in Louisiana east from the Atchafalaya.

The La Fourche is followed by an intricate network of lakes and bayous, which are mostly discharged into Barrataria bay. Having an open outlet to the sea, the overflow of the tract east from La Fourche, is neither so deep or permanent as that of the Atchafalaya valley above the mouth of Teche; but in the former case the real sea-marsh prevails much farther inland, and reaches to the vicinity of the Mississippi, south from its great bend near New Orleans. Very little arable soil exists in all the large triangle formed by the Mississippi river, Gulf of Mexico, and La Fourche river. The inlets of Barrataria bay are only navigable with small craft.

The coast at the outlet of La Fourche bends to the north-east, and by a bold circular sweep, first in that direction then east, and finally south-east, forms an open elliptical bay, between the outlets of La Fourche and the south-west pass of the Mississippi. The interior of this bay terminates in Barrataria lake, nearly due south from New Orleans.

We now approach to that very remarkable salient point formed by the main volume and real mouths of the Mississippi. This vast river stands alone in the manner of its egress. If, like the Nile, Ganges, Blue and Yellow rivers, the Orinoco, the Rhine and some others, the Mississippi divided its

volume into various outlets far in the interior, there would be nothing peculiar in its Delta; but as the Atchafalaya, Iberville, Plaquemine, and La Fourche are mere drains, and, accurately speaking, not real mouths, we may consider the entire volume as continuous over the main body of the Delta, and upwards of 30 miles into the Gulf of Mexico. The latter circumstance has no parallel in physical geography, even on a small scale. If the protrusion we have noticed is supposed removed, there would remain a tolerable near resemblance between the Delta of the Nile and that of the Mississippi, but the long narrow cape destroys the fancied resemblance, and leaves the Mississippi to form at its estuary a distinctive picture.

This noble river has three main and three lesser passes or outlets, which are marked on the accompanying sketch. The most frequented is the S. E. pass, with 12 feet water at ordinary tides. The S. W. pass has, in similar circumstances, nearly a like depth with that of the S. E. The other passes, that of the south, west, north-east, and La Loutre, have from 5 to 8 feet, but are but little frequented. The shallow water is only on the bars of either pass. I sounded both the main passes and that of the west, in April, 1818, and found deep water immediately outside of each. The depth increased more gradually within the channels, but in either, the largest ships of war could ride within one mile of the bar.

With the outlet of the Mississippi, the coast turns to a north course of 70 miles, with a curve to the west, to Pass au Marianne. The latter is the main outlet into the Gulf of Mexico, of a chain of lakes and inlets, which commences near the Mississippi, 50 miles to the N. W. by W. from New Orleans. The hilly and comparatively elevated country of the state of Mississippi, extends into Louisiana, gradually depressing, and finally terminates in moderately high bluffs or banks, near the Iberville, about 16

miles south from Baton Rouge. If we turn to the map of the Mississippi below the mouth of Ohio, we perceive that the channel of that river follows the eastern bluffs, and that the great body of overflowed surface is west from the stream, between the mouth of the Ohio and Baton Rouge: the windings of the Mississippi, in many places, reach the base of the eastern hills, but in no one instance do they approach those of the west. The cause of this phenomenon will be exposed in another part of this view.

The Iberville, or upper drain of the Mississippi, leaves the main volume near the termination of the eastern high land, and following its base N. E. by E. 15 miles, receives the Amite from the north, and inflecting to the east, by a very winding channel of 20 miles comparative course, opens into Lake Maurepas. The latter is a circular sheet of water about 8 miles each way, receiving from the north the Tickfoha, a small river rising in the state of Mississippi.

The pass of Manchac carries the waters of Lake Maurepas into the much more extensive Lake Pontchartrain, an ellipsis 20 by 32 miles, and a very general depth of from 18 to 20 feet. The longer diameter of Lake Pontchartrain is nearly from W. to E., and parallel to the opposing range of the Mississippi, in the vicinity of New Orleans, leaving an intermediate slip of low marshy, and mostly unwooded plain, of from 5 to 8 miles wide. Into the northern side of Pontchartrain is discharged the rivers Tangipao, and Chifuncte, with some minor creeks, and the entire mass of waters are discharged from the south-east curve of the lake by two passes, that of the Rigolets, and that of Chef Menteur, both again discharged into Lake Borgne.

Lake Borgne is, though denominated a lake, really a bay of the Gulf of Mexico, or a continuation westward of Pascagoula sound. North-east from

New Orleans, extends a peninsula, which is opposed by another of nearly similar extent, stretching to the south-west. The former bounded by Chef-Menteur, and the latter by the Rigolets, are separated by a marshy island between the two passes; the whole forming the disjointed isthmus, which spreads between Lakes Pontchartrain and Borgne, from 6 to 8 miles in width.

With about 9 feet water at each extremity, the Rigolets receives from the north, at near its mid-channel, a considerable stream, Pearl river, rising in the state of Mississippi at N. lat. 33° , long. $12^{\circ} 30' W.$. Interlocking sources with Big Black and Pascagoula rivers, the Pearl flows S. W. about 80, reaching to within 45 miles from the Mississippi at the mouth of Big Black, and thence inflecting to S. S. E. 160 miles, enters the Rigolets, after an entire comparative course of 240 miles. On strict geographical principles, from its very superior length and volume, and from the position of its estuary, Amite, Tickfoha, Tangipao, and Chifuncte, with the discharge of Lake Pontchartrain, are branches of the Pearl, and confer upon the latter the dignity of giving name to the basin in which it is the principal stream. Adopting this distinction, the basin of the Pearl occupies that part of the northern slope of the Gulf of Mexico, between the immediate confluents of Mississippi and those of Pascagoula.

Geographically the basin of the Pearl extends from N. lat. 30° to 33° , and in long. from 12° to $14^{\circ} 17' W.$ It will at once be seen by reference to the map of the Delta, that in the Pearl basin I have included the minor streams, having their sources near the very margin of the Mississippi, from Iberville outlet, to Bayou St. John, draining the streets of New Orleans. A single glance on the map of this region will exhibit the correctness of this arrangement of parts. In extent, the Pearl basin stretches 220 miles from S. to N., but with very unequal width. The

higher part of the basin confined to the mere valley of the Pearl for 120 miles, does not exceed a mean width of 30, or an area of 3600 square miles; but nearly E. from Natchez, at N. lat. $31^{\circ} 30'$, the basin widens rapidly; and spreads in form of a trapezium, with its longest side 120 miles from Biloxi bay to the efflux of the Iberville, and perpendicular 120, with an area of about 9600 square miles; which latter surface added to the higher extension of 3600, gives an entire superficies of 13,200 square miles.

Though the base of the basin of the Pearl, forms a decided connexion with the Delta of the Mississippi, the far greater part is composed of a soil and formation essentially distinct from recent alluvion, the component of the Delta. On the north side of the chain of lakes and inlets between the efflux of the Iberville and Biloxi bay, the surface rises for 8 or 10 miles, by a very gentle acclivity, but this slowly rising inclined plain is imperceptibly succeeded by hills; the surface becomes broken, and the *channels* of the streams more shallow, though their *valleys* sink much more comparatively deep; except near the water courses, pitch pine, *pinus strobus*, is the common timber. As the region of which the basin of Pearl forms a part, is an important and peculiar section of the United States, some amplification in this place may not be deemed irrelevant, and particularly as the observations, without much violence done to correct theory, may be extended to the larger basins of Pascagoula, Mobile, and Appalachicola.

Extending our views from Baton Rouge, or perhaps more correctly from the efflux of Iberville, to the mouth of Ohio, stretches a buttress, broken by numerous streams, and the projections of which, worn by the abrasion of the Mississippi, are known by the name of Bluffs. These Bluffs are the mere advanced points of the comparatively more elevated

country east of the Mississippi, above the overflowed tracts immediately west from that stream. The elevation of the Bluffs varies, but may be considered as exceeding 100 feet above the alluvial plains near the Mississippi, and the interior country rises by a moderate acclivity.

The excessively broken aspect of the country for 15 or 20 miles from the Mississippi, is calculated to deceive a casual observer, and induce him to exaggerate the actual height of the general surface, but more careful and continued observation discloses the real nature of the *ten thousand hills*, which lie scattered in wild confusion seeming to mock all arrangement. Advancing eastward, it is soon perceived that the hills near the streams are the remains left of a once extended terrace, now furrowed by innumerable channels. The soil of the bluff, or hilly tract, is almost uniformly productive, but as the hills subside into plains, the soil deteriorates, and the mingled forests of oak, sweet gum, poplar, *liriodendron tulipifera*, hickory of various species, and some pine, are followed by the almost exclusive prevalence of the latter tree.

It would not be much risk to estimate the pine tract as occupying two-thirds of all the superficies from the Atlantic ocean to the Sabine, along a zone from the 30th to the 33d degree N. lat. This species of soil, deriving its title from the most abundant timber it produces, terminates in some places abruptly, but in general gradually merges into what is known locally by the designation of interval land; a kind of soil partaking of an intermediate quality between actual alluvion and pine-land. Correctly speaking, the superstratum of the bluffs is a real interval land, and for variety of vegetable productions, highly valuable.

Before proceeding to delineate the residue of the coast of the Gulf of Mexico, from the Delta of the Mississippi to Florida point, we may pause and cast

a summary glance over that region of recent creation, the coast of Louisiana. The first sweep of vision along the entire line of sea coast from the Sabine to the mouth of the Pearl, spreads before us a marsh of upwards of 400 miles, interrupted only by the water courses. On a near approach to their line of separation, the waves of the Gulf can be still, with some difficulty, distinguished from the very little more elevated green of the marshes. A few shrubs and clumps of trees are perceived at a distance in solitary groups, to mark the commencement of a more majestic vegetation. To the northwest, along the Teche, Vermillion, Mermentau, Calcasieu, and Sabine, beyond the marshes, and with a moderately greater elevation, immense prairies would be seen to extend, and most elegantly ornamented by the serpentine lines of forest, curving with the concealed channels. Still farther inland, and on all sides, beyond the marshes and prairies, the perspective would be darkened by dense and continuous forests, through which would be seen the tortuous Mississippi rolling, with solemn and irresistible majesty, towards its only successful rival the Gulf of Mexico.

Suppose for a moment, that stream at its utmost elevation; suppose the wide recesses we have described to be gorged to overflowing, and then imagine the forest removed from the inundated plains, and what a picture would open to the eye. From the prairies and marshes of Attacapas and Opelousas, to the bluffs of the Mississippi, the water courses would vanish, and before us would spread a vast lake of upwards of 100 miles in length, with from 10 to 40 miles in width. The very narrow alluvial borders along the streams would, like the wooded lines over the prairies, decorate and embellish, without greatly diminishing the expanse of waters. On the east, the limit of this annually recurring inland sea, would appear strongly defined, but

on the west, the demarcation with the prairies and marshes, would be faint and indefinite. But of all the wonders of this annual deluge, the most curious is certainly the almost exact resemblance, mere magnitude of volume only excepted, between the two bounding rivers, the Mississippi and Teche; and what is peculiarly worthy of notice, the latter river coasts, without either receiving or participating of the water contained in the adjacent lake.

From the preceding data, may be conceived the impenetrable nature of the Louisiana coast, except through the channels of the rivers. Even by those entrances, 12 feet is the deepest water which can be calculated on at all seasons, and that depth only in the Mississippi. Extremes in no instance can more effectually touch, than in the case before us. No walls of rock, however high and rude, could more completely oppose all approach, than do the low shores, shallow waters, and marshes of Louisiana.

I have in the preceding survey omitted a particular review of the outlet of the Mississippi itself, or of its course over the Delta, only as incidentally necessary to complete a notice of the minor streams. This apparent omission of what constitutes the primary object in a review of the sea-border of Louisiana, was an intentional postponement to the close of the article. The channel of the Mississippi is intimately connected, not alone with the Delta, but also with the basin generally, and can be more appropriately reserved to the close of the article. We therefore now resume our survey of the coast eastward from the Delta.

We have given a passing notice to a low flat and marshy peninsula, which projects to the N. E. from the lower part of the Delta. It is this peninsular flat, the isthmus between Lakes Pontchartrain and Borgne, and the southern coast of the state of Mississippi, which form that deep and shallow bay mis-named *Lake Borgne*, a parallelogram extending

40 miles from S. W. to N. E., with a mean width of 15 miles.

Lake Pontchartrain, the Rigolets, Lake Borgne, and below the latter, the Pass of Christian, Pascagoula sound, and Pass of Heron, form an interesting inland navigation into Mobile bay. This channel is formed by the main shore of Mississippi, and south-western Alabama, on the north; and a chain of long, low, sandy islands, stretching from the mouth of Mobile bay, in a western direction towards the Rigolets. These islets are, advancing from the west to east, the groups of Malheureux and Marianne, the solitary Cat island, Ship island, Dog island, Horn island, Petite Bois, and Dauphin island. In ordinary stages of the water, this coast passage cannot be made with vessels drawing above 5 feet water, as over the shoals of either Heron or Christian, that is about the common depth. Distance from New Orleans to Mobile bay by this inner passage, 100 miles; and 130, if extended to the city of Mobile.

This inland channel is again continued N. W. from New Orleans 125 miles, following the windings of Lake Pontchartrain, Pass of Manchac, Lake Maurepas, Amite and Iberville rivers, to the Mississippi, at the efflux of the latter outlet. Schooners, and other vessels of 5 feet draught, can be navigated to Galveztown, at the junction of the Iberville and Amite.

In every section of this chain of navigable rivers, lakes, inlets, and sounds, it has been shewn, that 18 feet water in Lake Pontchartrain is its deepest part. Some projects have been broached for making this line, the principal channel of internal navigation in the Delta; I trust I shall, however, demonstrate in the sequel of this article, that the heaviest ship of war that is now in the United States' navy, could be navigated from the Gulf of Mexico to New Orleans by the channel of the Mississippi, at greatly less expense than could a vessel of 10 feet draught be made

to float down the Iberville, Amite, Lake Maurepas, and Pontchartrain, to the mouth of Bayou St. John. I may now say *en passant*, that the former is practicable, the latter almost beyond human means.

In the eastern extension of the preceding channel, the only river worthy notice which it receives, is the Pascagoula, an unimportant stream, however, in a navigable point of view. It rises on the angle between the sources of the Pearl and the confluent of Tombigbee; flows south 120 miles under the name of Chickasawhay; where it is augmented by a large confluent from the north-west, Leaf river. Assuming below their junction the name of Pascagoula, continues south 50 miles, and falls into a sound of the same name, opposite Horn island, and receiving near its outlet, a considerable tributary, Dog river from the N. E.

The marshy coast of the Gulf of Mexico terminates with the Rigolets, and eastward of that inlet, the pine tract reaches the gulf, and that tree thence constitutes the prevailing timber along the sea coast of Mississippi, Alabama, and great part of Florida. At the mouth of the Pascagoula, pine forests extend from the margin of the sound. The few dwarf trees on the Sand islands opposite, are also pine. It was at this very spot, that I felt myself beyond the alluvial creation of the Mississippi. Examining the coast from the mouth of Pearl to that of Mobile, the shores seemed rather yielding to the waves than augmenting by any deposit carried inland by their means. West of the mouths of the Mississippi, as far as I have examined the coast, the *debris* brought down its surface are distributed in great abundance; eastward of the Delta, these fragments are no where found. These facts shew the course of the currents along the northern shores of the Gulf of Mexico, to be westward, and serve also to direct the approach of vessels to the entrance of the Mississippi.

Mobile bay is a fine triangular sheet of water 30 miles in length and varying from 18 to 3 miles wide. The projection of Mobile point, and the position of Dauphin island, land-lock this bay. The main entrance with 16 feet water, winds between Dauphin island and the western cape of Mobile point, close upon the latter. Between Dauphin island and the main shore of Alabama, lies the Pass of Heron with 5 feet water. The depth over the main bar is maintained inland to about 5 miles below the city of Mobile, where another bar, or sand bank, with only 10 feet water, crosses the bay from W. to E.

Into Mobile bay is poured the river of the same name, the discharge of a triangular navigable basin of 37,120 square miles. The Mobile river is formed by two great branches, the Tombigbee from the north-west, and Alabama from the north-east.

The Tombigbee is formed by two branches; the Tuscaloosa (*Black Warrior*), and Tombigbee. The latter rises in the north-east angle of the state of Mississippi, in the country of the Chickisaws, at N. lat. $34^{\circ} 40'$, long. $12^{\circ} 20' W.$, the branches, however, rising with the small creeks of Tennessee, through 100 miles, interlocking westward with those of the Yazoo, or Tallahatcha, and eastward with those of the Sipsey or New river. Flowing by a general course, nearly south, 100 miles, the various branches having united, incline to a little E. of S., and enter the state of Alabama, at N. lat. $33^{\circ} 16'$, 5 miles below Columbus, the seat of justice for Monroe county, Mississippi. At this point the Tombigbee is already a navigable river, having drained a surface of at least 5000 square miles. Below the Alabama line 5 miles, the Sipsey or New river enters from the E., and the main stream, in a course S. S. E. of 5 miles, is again augmented by the still more important branch, the Tuscaloosa, after an entire consecutive course of 170 miles; at N. lat. $32^{\circ} 31'$, long. $18' W.$ (*Tanner's map*).

It will be seen, when treating of the Tennessee, that in its curve through Alabama, it flows near the lower margin of the mountain valley. It is from this formation of the intermediate country, that the sources of the Mobile basin through upwards of 400 miles, circle round and approach the actual channel of Tennessee, within from 10 to 25 miles. The extreme north-eastern branch of the Tuscaloosa, rises at N. lat. $34^{\circ} 20'$, long. $9^{\circ} 14' W.$, and but little above 10 miles from the channel of Tennessee river, at the Great Bend, Decatur county, Tennessee, and about an equal distance from the Coosa, at the mouth of Will's river. Pursuing a south-west course 150 miles, receives numerous confluent from the north-west. The valley of Tuscaloosa is triangular; base 150, and perpendicular 56; mean width 28, and area 4200 square miles.

Below the junction of its two main branches, the Tombigbee, with a very winding channel, curves by an elliptical sweep to the west, but by a general course, but very little W. of S., 90 miles, to N. lat. $31^{\circ} 09'$, where it unites with the Alabama from the N. E. Between the mouths of the Tuscaloosa and Alabama, the Tombigbee receives no tributary above the size of a large creek, and its valley does not exceed a mean width of 35 miles, or contain an area above 3150 square miles: the entire valley, including that of Tuscaloosa, having a superficies of 13,350 square miles.

The Alabama is formed by two branches, the Coosa and Tallapoosa. The Coosa rises at N. lat. $35^{\circ} 05'$, long. 7° to $8^{\circ} W.$, in the northern part of Georgia, interlocking sources with Tennessee, Hiwassee and Chatahooche rivers. The Etowah or extreme north-eastern branch, heads in the angle between the Hiwassee and Chestatee branch of Chatahooche, and flowing 35 miles a little east of south, and parallel to the Chestatee, bends thence west 30 miles, and thence S. S. W. 35 miles to N.

lat. 34° . Curving abruptly to the N. W. by W. 30 miles, receives the Oostenalah, and assumes the name of the Coosa.

The Oostenalah rises in Georgia, and at N. lat. $35^{\circ} 05'$, in the angle between the Tennessee and Etowah rivers, and falls but little short of the latter in volume, but both streams having their sources in the highest nucleus of the Appalachian mountains, are large and rapid rivers compared with their length of channel.

The Coosa, below the junction of its two constituent branches, flows west 8 miles and enters Alabama, near Fort Armstrong,* and inflecting to S. W. by W. about 35 miles, receives Will's creek on N. lat. 34° , long. $8^{\circ} 05'$ W. Bending to S. S. W. 75 miles to N. lat. 33° , again by a gentle curve turns to S. S. E. about 40, and thence S. W. 10 miles to its junction with the Tallapoosa, at N. lat. $32^{\circ} 28'$, long. $9^{\circ} 22'$ W., after an entire comparative course of near 300 miles.

From the circuitous windings of the Coosa, its valley is not more than two-thirds the length of its channel, or about 200 miles. Receiving no considerable branches, the mean width of the valley is only about 45 miles; area 9000 square miles.

The Tallapoosa rises in Georgia near the channel of the Etowah, and between the Chatahooche and Coosa, at N. lat. 34° , long. 8° W. Without receiving any considerable confluent in the intermediate distance, Tallapoosa enters Alabama, flows S. S. W. 120 miles, and receives the Tallasse creek from the east, and abruptly bending to the W. 25 miles, unites with the Coosa, and forms the Alabama, at the village of Coosawda, Autauga county, Alabama.

The valley of Tallapoosa is about 125 by 35 miles; area 4375 square miles: Extending from N. lat 32° to 34° .

* Tanner's Map.

From Coosawda, the Alabama flows by comparative courses a little S. of W. 50 miles, receives the Cahaba, a considerable confluent from the N., inflects to S. S. W., and continues that direction nearly 100 miles to its junction with the Tombigbee.

There is perhaps no other river in the United States in which the actual length of the channel and those of the comparative courses differ so much as in the Alabama. By its two general courses, one above and the other below the influx of the Cahaba, this river is about 150 miles in length; but if estimated along its banks it would exceed 100 above, and amount to near 200 below the Cahaba.

Including the valley of the Cahaba, that of the Alabama is of very irregular form, stretching from N. lat. $31^{\circ} 04'$ to $33^{\circ} 47'$, and containing by actual survey 8460 square miles.

Before their actual junction, some one or more small outlets partially unite the waters of Tombigbee and Alabama, and after uniting and losing their names in that of Mobile, the mass of water does not immediately intermingle in one bed, but penetrating the inundated intermediate flat by two main and numerous smaller channels, flows upwards of 30 miles before the whole is lost in Mobile bay; out of which it is again discharged around Dauphin island.

The valley of the Mobile proper is about 60 by 30 miles, or 1800 square miles, one-third at least occupied by the bay, leaving 1200 square miles for the two small slopes on each side of the bay and river.

Mobile basin, at its north-eastern extremity, is followed by that of Appalachicola, but these two basins receding from each other towards their respective estuaries, leave a comparatively small, but a very important, intermediate basin, having Pensacola for its principal entrance from the Gulf of Mexico. It has, however, two more bays of considerable extent, Santa Rosa and St. Andrews; and Perdido may be also considered a part, though de-

riving consequence merely as a political boundary between Florida and Alabama.

Pensacola bay is the estuary of several small creeks or rivers, and one stream, the Escambia, of considerable magnitude. The Escambia is formed by two very unequal branches, the Escambia proper and Connecuh. The Escambia is a mere creek, rising in Monroe county, Alabama, and flowing S. S. E. over Baldwin and Connecuh counties enters Florida, and falls into the Connecuh river, about 2 miles below the boundary between Alabama and Florida.

The Connecuh is a river of much greater magnitude than its confluent the Escambia. The latter rises in Alabama and in the angle between the Tallapoosa and Chatahooche rivers, at N. lat. $32^{\circ} 10'$, long. W. C. $8^{\circ} 30' W$. Flowing thence 130 miles south-west enters Florida, and receiving the Escambia the united water assumes the latter name, and turning to a little E. of S. 25 miles, is lost in Escambia bay, the northern arm of Pensacola bay.

Pensacola bay, forming the deepest haven of the United States on the northern coast of the Gulf of Mexico, opens from that Gulf at N. lat. $30^{\circ} 19'$, long. $10^{\circ} 18' W$. The entrance is about 8 miles S. S. W. from the city of Pensacola, and formed by the main channel and by Santa Rosa sound. The bay widens above Pensacola, and extending a little N. of E. 20 miles, terminates to the north in two deep sub-bays, Escambia and Yellow Water. The latter is the recipient of several creeks of little consequence, rising in the Pine woods, north-east from the city of Pensacola.

The surface of Pensacola basin, with the exception of a few confined strips along the streams, and some interval land, is a sterile pine forest, or open prairies of similar soil.

The depth on the bar 21, and in the harbour of Pensacola from 23 to 36 feet, admits vessels draw-

ing 20 feet water to enter safely. The bottom, both in the entrance and bay, is either a fine sand or mud. Like some harbours on the Atlantic coast, Pensacola stands indebted for its depth of water to the circumstance of not receiving any large river, the alluvion of which, if any such had existed, would, in the course of time, have changed it to a shallow waste.

One of those long, narrow, and low sand islands, so common on the Atlantic coast and on the shores of the Gulf of Mexico, extends from Pensacola 40 miles N. E. by E., to an entrance into a considerable bay, the Choctawhatchie. The sound within Santa Rosa island is like the island itself, narrow, and is also a mere elongated shallow, which, within its entrance, turns to east 25 miles, and receives from the north-east Choctaw river, a stream of about 80 miles comparative course, rising in Henry and Pike counties, Alabama. As a navigable basin Santa Rosa or Choctawhatchie bay is unimportant.

If due attention is paid to the philosophy of the seacoasts of the United States, no rational doubt can be entertained but that those elongated sand islands are mere bars, formed when the oceanic level stood above their surface. The coast of Louisiana, Alabama, and Florida, exhibit a constant succession of ridges with every appearance of islands, except being now joined to the continent. This formation of coast is in a particular manner observable west from the Delta, and again along the coast of Florida. The chain of islands, however, which we have seen stretching from the Rigolets to Mobile bay, is in reality one of those sea-bars, which is again continued in Mobile point, and broken by Perdido, reaches to Pensacola. Santa Rosa island perpetuates this chain, and beyond Santa Rosa inlet, inflecting to S. E. by E. 65 miles, is once more interrupted by St. Andrew's inlet.

St. Andrew's bay is the last advancing from the west, of the intermediate basins between Mobile and Appalachian rivers, and is of little consequence as a navigable entrance. Unlike Mobile, Pensacola, Perdido, and Sta. Rosa, which all more or less incline to the north-east, St. Andrew's bay stretches to the north-west, almost insulating the sandy isthmus between Santa Rosa bay, Choctaw river, St. Andrew's bay itself, and the Gulf of Mexico.

Taken in its full extent, including the confluent sources of Perdido, Pensacola, Santa Rosa, and St. Andrew's, the Pensacola basin extends from the western sources of Perdido to the eastern bend of the Ekanfinna river 160 miles, with a mean breadth of 80 miles, area 12,800 square miles.

The sources of the Coosa river and those of the Chatahooche rise together in the northern part of Georgia, the latter being the principal confluent of the basin of the Appalachian.

The Chatahooche river rises in the highest table land of the Appalachian system, at N. lat. 35° , long. $6^{\circ} 20' W.$, interlocking sources with those of the Coosa, Hiwassee, Tennessee, and Savannah rivers. The higher Chatahooche is formed by two branches, the Chestatee and Chatahooche proper. The former is the main stream, drawing its most remote sources from Habersham county, Georgia. Flowing west 25 and thence S. S. W. 75 miles, and crossing N. lat. 34° , the Chestatee receives from the north-east the Chatahooche. The latter, rising with the Chestatee and Savannah rivers, flows S. S. W. 70 miles, having only a mountain ridge between it and the higher branches of the Oconee and Ocmulgee branches of the Altamaha, and joins the Chestatee.

The Chatahooche, below the junction of its two constituent branches, flows S. S. W. 50 miles, and thence, with a slight elliptical curve to the west, pursues a general southern course of 200 miles to

its junction with Flint river, from the north-east. It is remarkable that in such a distance as 250 miles, from the junction of Chestatee and Chatahooche to the mouth of Flint, no tributary stream enters the main recipient above the size of a large creek, and the valley at its widest part does not exceed 50 miles, averaging perhaps 35 miles from its highest point. Entire length of this long vale about 320 miles; area 11,200 square miles.

Flint river rises in Henry, Fayette, and De Kalb counties, in Georgia, at N. lat. $33^{\circ} 30'$. Pursuing a southern course between the Chatahooche and Ocmulgee 130 miles, turns thence 80 miles S. W. to its junction with Chatahooche, after an entire comparative course of 210 miles. Similar to that of the Chatahooche, the Flint river valley is narrow, averaging a mean width of about 40 miles and with an area of 8400 square miles.

The united streams of Chatahooche and Flint assume the name of Appalachicola, which flowing nearly due south 70 miles, receiving from the north-west the Chipola, and separating into several channels, opens into St. George's sound at N. lat. $29^{\circ} 46'$, and into the open Gulf of Mexico at N. lat. $29^{\circ} 38'$. The Appalachicola is the only river of the Gulf of Mexico, except the Mississippi, which forms a salient delta at its estuary; and it is, of all the rivers of the United States of equal length, the one which presents the greatest variety of climate.

The lower valley of the Appalachicola is 70 by 30 miles, area 2100 square miles.

Though less in volume, it is a more navigable stream than the Mobile as to distance, though the latter admits the entrance of the largest vessels at its mouth. The ascent of sea vessels is arrested in Tombigbee at or near Fort St. Stephens; in the Alabama at Claiborne, and in the Appalachicola near its head.

The basin of the Appalachicola extends through

upwards of $5\frac{1}{2}$ deg. of lat. and rising on a table land at least 2000 feet above the level of the Atlantic ocean, or an equivalent in height for five degrees of lat., the temperature must have a difference of 10 degrees.

From Cape St. George, the extreme southern point of the delta of the Appalachicola, to the Point of Pines, the western termination of St. David's bay, distant about 90 miles, is the chord of an elliptical sheet of water or bay of Appalache, the curve waving northward, and having at its innermost extension Ocklockonne bay and the mouths of St. Mark's and Auscilla or Ocklockonne rivers. The depth of this bay is the north-east angle of the Gulf of Mexico.

As a navigable basin, that of Appalache is of minor importance, but gains some consequence as being the inlet to Tallahassee, the newly established capital of Florida. Its principal inlet the Ocklockonne rises in Georgia at N. lat. $31^{\circ} 35'$, long. $6^{\circ} 40'$ W. Flowing south 40 miles, thence south-west 60 miles, receives from the north-west the Atapulguas, and turning thence south-east 25 miles into Appalache bay, after an entire course of 125 miles, nearly one-half in Florida.

The St. Marks is a short river or bay of about 20 miles comparative course, rising at N. lat. $30^{\circ} 20'$, 15 miles south-east from Tallahassee. Its source is a large pond or lake, from which it flows a little W. of S. and is navigable for boats of considerable tonnage to its very source.

The Suwanne follows the Appalachicola basin at the source of the former; but in their respective courses towards the Gulf of Mexico enclose between them the more confined basin of the Appalache. The Suwanne rises in Dooley county, in Georgia, between the Flint and Oakmulgee rivers, and heading also with the great St. Illa. It is formed by two branches, the Alapapaha to the east, and Suwanne

proper to the west. The extreme source of the latter is at N. lat. 32° . Pursuing a southern course 70 miles, it thence inflects to S.S.E. 35 miles, enters Florida, and continues the last course 30 miles, receiving the Alapapaha from the N.E.

The Alapapaha rises at N. lat. $31^{\circ} 35'$, between the sources of the Suwanne and St. Mla, and flowing thence 80 miles, receives from the N.E. the drain of the tract absurdly called Okofinoke swamp, turns to S.W. 10 miles, and unites with the Suwanne, at N. lat. $30^{\circ} 25'$, long. $6^{\circ} 20' W$. The united vallies of the Suwanne and Alapapaha above their junction, form a parallelogram of about 85 by 50 miles, area 4250 square miles.

The Suwanne, now a considerable stream, flows by a rather circuitous channel, but by comparative courses 65 miles, separating the basin of St. John's from that of Appalache, and falls into the gulf of Mexico, between Sta. Fe and Vacasausa bays, at N. lat. $29^{\circ} 20'$, long. $6^{\circ} 13' W$. In Florida, Suwanne receives few tributaries from the west, and those it does receive from that side are mere creeks; but on the eastern side, about 30 miles above the mouth, a very remarkable stream enters, the Santa Fe. This small river heads with Black creek of St. Johns, and is composed of two branches, both of which have natural bridges; the main or eastern branch flowing 3 miles, and the western half a mile subterraneously, before their junction.

The valley of the Suwanne below the junction of its main constituents, is in length from north to south, 65, with a mean width of 40 miles, area 2600 square miles. Entire area of the basin 7200. Geographically, Suwanne basin extends from N. lat. $29^{\circ} 24'$, to N. lat. 32° , long. W. C. from $5^{\circ} 24'$ to $6^{\circ} 53' W$.

This river closes the list of tributary rivers entering the northern shore of the Gulf of Mexico. As laid down in Tanner's map of Florida, this bay is traversed by long. W. C. $6^{\circ} W$., and towards the

southern extremity by N. lat. 29° . It is therefore directly east from the mouths of the Mississippi, distant 7 degrees of longitude or 432 miles.

With Vacasausa bay, commences on the western side the peninsula of Florida. Nature has, indeed, traced no definite limit to this section of North America; but contrasting its position with the adjacent part of the continent, the mouths of Suwanne and St. Johns seem to present sufficiently accurate points of separation. Assuming, therefore, these boundaries, a line of about 120 miles within a small fraction, will define the north-western extremity of the peninsula. It is, however, little more than 90 miles directly across from the bottom of Vacasausa bay to the harbour of St. Augustine. From the north-east angle of Vacasausa, the shores of the peninsula, on the western side, incline a little W. of S. 60 miles to the mouth of Amasura river. Here the peninsula is upwards of one hundred and twenty miles wide; a width which it maintains with little variation for 250 miles. In this distance, the only large entrances are, Tampa, or as formerly called, St. Espiritu Santo, N. lat. $27^{\circ} 50'$, and Charlotte harbour at $26^{\circ} 50'$. Thus far the western coast inclines slowly eastward, and at Cape Romano, lat. 26° , in nearly $3\frac{1}{2}^{\circ}$ of latitude, has only made 1° of longitude; but, with Cape Romano commences a deep indenting eastward of upwards of 30 miles, forming Gallivan's bay. With N. lat. 26° , both sides of the peninsula rapidly tend to a point, and finally terminate at Cape Sable, N. lat. $25^{\circ} 04'$, long. $4^{\circ} 14'$ W.

Too little is accurately known of the western coast, and of the rivers flowing from Florida into the Gulf of Mexico, to admit any beneficial detail. The interior structure of the earth on this remarkable peninsula, even renders the very sources of the rivers in great part undefined by nature. It seems to be in fact a region recently and partially wrested from the retiring ocean, and presents, in the forma-

tion of its rivers, a similar aspect, which characterised perhaps all rivers at the epoch of their primitive commencement.*

There appears, too, a general and very gradual inclination from north to south. Hills of some elevation, and calcareous components, stretch between the sources of St. Johns and Amasura rivers; but, advancing more southward, the whole surface becomes a dead, and in great part inundated plain. In Chapter II. of this view, the peculiar structure of the peninsula of Florida, was noticed in discussing the phenomena of the gulf stream. It will not be necessary to pursue the subject farther in this place; we shall, therefore, proceed to a summary of the basins of the Gulf of Mexico, the general features of which we have sketched.

* See Basin or Valley of Ohio.

No. XIX.—*Table of the extent and geographical position of the smaller river basins in the vicinity of the Delta of the Mississippi.*

BASINS.	Length.	Mean width.	Area in sq. miles.	Between latitude		between longitude	
				N.	N.	W.	W.
Sabine, in the U. S.	200	20	4,000	29° 25'	32° 26'	16° 12'	17° 10'
Calcasieu	150	30	4,500	29 32	31 30	15 44	16 48
Mermentau	100	30	3,000	29 32	30 53	15 17	16 02
Vermillion	80	30	2,400	29 35	30 31	14 33	15 40
Atchafalaya, Teche, &c.	160	35	5,600	29 30	31 32	13 50	15 40
Terre Bonne	50	25	1,250	29 00	29 45	13 10	13 50
La Fourche	85	2	170	29 14	30 04	13 00	14 06
Barrataria	60	25	1,500	29 00	30 05	12 30	14 00
Pearl	220	60	13,200	30 00	33 00	12 00	14 17
Pascagoula	165	40	6,600	30 18	32 40	11 22	13 00
Mobile	290	128	37,120	30 14	35 05	7 00	12 30
Pensacola, &c.	160	80	12,800	30 00	32 10	8 20	10 54
Appalachicola	385	53	20,405	29 38	35 10	6 20	9 35
Appalachie	100	45	4,500	30 00	31 35	6 30	7 45
Suwanne	180	40	7,200	29 24	32 00	5 24	6 53
Western slope of the Peninsula of Florida	340	55	18,700	25 00	30 00	3 35	6 13
			144,240*				

* Of this area, 2420 is W., and 121,820 E. from the Mississippi.

CHAPTER VIII.

GEOGRAPHICAL VIEW OF THE GREAT CENTRAL
BASIN OF THE MISSISSIPPI.

BEFORE proceeding to a specific description of the natural sections of the Mississippi basin, the following tabular view is given of each valley.

I would have been rejoiced to have had it in my power, to insert as detailed a tabular view of the particular vallies of the Mississippi basin, as has been given on the Atlantic slope; but the existing state of settlement, and geographical science, are neither sufficiently advanced to admit great detail in the former instance. The greater part of the Ohio valley, and east of the Mississippi generally, is fully explored; but to the westward of the latter river, except in Louisiana, eastern Arkansas and Missouri, though the outline is known, the minute features have not been yet examined with accuracy, and delineated on our maps. It has been my endeavour to state known facts; and where discovery had not afforded certain documents, to be silent. In what I have given, my authorities may have deceived me; but I hope such instances are rare and unimportant.

NATURAL SECTIONS.	Length.	Mean width.	Area in sq. miles	Between latitude		between longitude	
				N.	N.	W.	W.
Ohio Valley	750	261	196,000	34° 00'	42° 30'	1° 00'	11° 40'
Mississippi Valley, above Ohio, including the minor valley of Illinois, but exclusive of Missouri	650	277	180,000	37 00 48 00		9 00 20 00	
Lower Valley of the Mississippi, including White, Arkansas, and Red River valleys	1,000	200	200,000	29 00 42 00		11 00 30 00	
Missouri proper, including Osage, Kansas, Platte rivers, &c.	1,200	437	523,000	37 00 50 00		13 00 35 00	
Total	-	-	1,099,000				

From the preceding table we find that the entire surface drained by the Mississippi and confluent, amounts to the great extent of one million and ninety-nine thousand square miles. It may be seen by reference to table 18, page 257, that the aggregate extent of the Atlantic slope including St. Lawrence basin, amounts to 820,530 square miles, or little more than two-thirds of the extent of the immense regions included in the drain of the Mississippi. I shall now proceed to sketch a brief view of each valley of this important basin, and make the survey in the same order as they stand in table 20.

Ohio Valley.—It has been long my opinion that the Ohio Valley once composed an immense inclined plane, into which the beds of the rivers have been formed by abrasion of water. A similar opinion was formed by Mr. A. Bourne, author of a very valuable map of the state of Ohio, and so very well explained by that gentleman in a letter, from which I quote his words:—"The hills are generally found near the rivers or large creeks, and parallel to them on each side, having between them the alluvial valley, through which the stream meanders, usually near the middle, but sometimes washes the foot of either hill alternately. Perhaps the best idea of the topography of this state, (Ohio) may be obtained by conceiving the state to be one vast elevated plain, near the centre of which the streams rise, and in their course wearing down a bed or valley, whose depth is in proportion to their size, or the density (solidity must be meant) of the earth over which they flow. So that our hills, with some few exceptions, are nothing more or less than cliffs or banks, made by the action of the streams: and although these cliffs or banks on the rivers or larger creeks, approach the size of mountains, yet their tops are generally level, being the remains of the ancient plain. In the eastern part of the state, some few hills are found in sharp ridges, similar to those in

the eastern states. The bases of the hills are generally composed of limestone, free or sandstone, slate, and gravel, admixed with mineral coal, ochre, &c."

The entire valley of Ohio, as well as most other parts of the basin of Mississippi, rests on horizontal strata, belonging to that formation called by geologists floetz or secondary. In 1815 I surveyed Pittsburgh and its environs, and found the rocks so nearly parallel to the horizon, as to scarce admit a current from the deep perforations of the coal mines. These mines are opened along the sides of the hills, and extend inwards on a level with the horizon, and about 320 feet above the lower surface of the adjacent rivers. The circumstance most conclusive of the fact, that the hills and vallies of this region were formed by abrasion, is the uniformity of elevation, and similarity of material, of corresponding strata, on the opposing banks of the streams: phenomena, however, every where visible, in Ohio valley, where the nature of the country will admit accurate observation.

The Ohio valley is subdivided by the Ohio river into two unequal sections, leaving on the right or N. W. side 80,000, and on the left or S. E. side 116,000 square miles; the Ohio river flowing in a deep ravine, and forming a common recipient for the water poured down from both slopes. The length of the Ohio ravine in a direct line from the city of Pittsburgh to the Mississippi river, is 548, but by the meanders of the stream 948 miles.

The peculiar features of this river, and its immediate banks, have led to most of the gross misrepresentations respecting the valley in general. The low water surface of the Monongahela at Brownsville, is 850, and at Pittsburgh 830 feet above the tides in Potomac river at Washington city. The apex of the hills around Pittsburg are within a small fraction of 460 feet above low water level in the rivers in the same vicinity. These elements give us 830 to be

added to 460, or 1290 feet, as the extreme elevation of the hills near Pittsburg. The data being in great part drawn from actual admeasurement may be considered as correct, and combining the result with the hypothesis of the whole valley being once an inclined and unbroken plain, we are led to the conclusion that about 1300 feet in round numbers was once the general elevation of that plain, where the Monongahela and Allegany now form the Ohio. The plain must have risen considerably higher towards the Appalachian system, and towards lake Erie, and declined slowly towards the Mississippi and Illinois rivers; and such depression, though more gradual, must have continued until the land sunk under the Gulf of Mexico.

The elevation of surface at the central junction of the Ohio and Mississippi, has not been determined with the same precision as has been done respecting that near Pittsburgh, but may be estimated with considerable accuracy from the length of the Mississippi below the mouth of Ohio, which is very nearly 1100 miles. If we allow $3\frac{1}{2}$ inches fall to each mile, we shall have 3850 inches, equal to 321 feet within a very small fraction, for the height of the country at the junction of Ohio and Mississippi rivers. Deducting 321 from 830, would leave 509, as the fall in the Ohio; but this sum exceeds the real depression of that stream. A very considerably greater fall exists from Pittsburg into Chesapeake bay, than into the Gulf of Mexico, a seeming anomaly explicable from the simplest laws of hydrostatics. When speaking of the Gulf of Mexico, in Chapter III, page 86, it was stated that this sheet of water was a real reservoir, supplied by the Gulf stream, and evidently elevated above any other part of either ocean which laves the coast of America. The gulf stream flows from the Gulf of Mexico into the Atlantic ocean with great velocity, and the current, though continually lessening, is continued from the Bahama chan-

nel to the coasts of Europe and Africa, by a curve of upwards of six thousand miles ; but if we restrict our view to the higher part of the tropic current, or that from Cuba to Chesapeake bay, or about 1000 miles, the velocity of the stream must demand at least an inch fall per mile, or 83 feet. If this hypothesis is correctly formed from existing data, then is the surface of Chesapeake bay 83 feet depressed below that of the Gulf of Mexico, and of course the fall of water from Pittsburg into the latter recipient only 747 feet. The allowance I made in my geographical dictionary on this head, page 476, was 125 feet, and I am now far from being certain, that the diminution to 83 feet is better sanctioned by the real phenomena.

It is a fair induction from what has been stated, that the valley of Ohio is composed of an inclined plain, furrowed by the deep channels of the rivers, and chequered by hills and alluvial flats, the whole resting on a floetz or secondary formation. In some parts of the basin, particularly in the state of Kentucky, the rivers flow in chasms rather than valleys, in the true meaning of the latter term. The two opposing slopes present some curious contrasts. Though most extensive, the south-eastern slope has no considerable remains of the ancient plain ; the north-western slope on the contrary, contains in the central parts of Ohio, Indiana, and Illinois, large tracts marking unequivocally the primitive state of the valley. The confluent of Ohio, which flow from the Appalachian mountains, are precipitous torrents from their sources, and, as has been already noted, pursue their courses in deep channels ; whilst those streams which derive their fountains from the north-western slope, rise on a continuous plain, in some places morass, sluggish towards their sources, but gaining velocity as they approach the Ohio.

The principal confluent of Ohio from the south-eastern slope are, the Monongahela, Little Kenhaw:

Great Guyandot, Sandy, Licking, Kentucky, Greene, Cumberland and Tennessee. Those flowing from the north-west are the Allegany, Beaver, Muskingum, Hockhocking, Sciota, Miami and Wabash. Of these streams, the Allegany and Monongahela are the constituents of Ohio; the former rising in Pennsylvania and New York, and fed by numerous branches, pursues a general course of S. a little W. 200 miles, but with a very circuitous channel, and unites with the Monongahela at Pittsburgh. The latter rises in Virginia at N. lat. 38°, by two branches, the Monongahela and Cheat; draining Pocahontas, Lewis, Randolph, Preston, Harrison, and Monongalia counties, unites immediately within the southern boundary of Pennsylvania, and continuing by a general course nearly north, joins the Allegany, and forms the Ohio, after a comparative course of 150 miles, but perhaps 200 by the windings of the streams.

The sources of the Allegany are the extreme north-eastern tributaries of the Mississippi basin, and flow from the highest part of the Ohio valley. Westward from the valley of the Allegany, that of the Beaver exhibits the commencement of the central plain which divides the basins of Mississippi and St. Lawrence. This plain stretches westward, and widening in extent over the states of Ohio, Indiana, and Illinois, reaches the Mississippi river. In its natural state, the valley of Ohio was generally covered with a very dense forest, but the central plain presented an exception. As far east as the sources of Muskingum, commenced open savannahs, covered with grass, and devoid of timber. Similar to the plain itself, those savannahs or prairies expanded to the westward, and on the waters of Illinois opened into immense natural meadows, generally known under the denomination of prairies, from using the French word for meadow.

It has been shown in this article, that Pittsburg

was elevated 747 feet above the surface of the Gulf of Mexico. Lake Erie has been found 564, and Pittsburg 830 feet above tide water in the Atlantic bays of Chesapeake, Delaware, Hudson, and St. Lawrence; consequently Pittsburg is elevated 265 feet above lake Erie; the intermediate distance in a direct line, 105 miles. Therefore, if a channel could be opened from the level of Ohio at Pittsburg, as deep as the bottom of that river, and carried into lake Erie, the water of Allegany and Monongahela, in place of flowing toward the Gulf of Mexico, would rush into lake Erie with a velocity of 265 feet in 105 miles, or upwards of $2\frac{1}{2}$ feet per mile.

A due attention to these mathematically established facts, will enable the reader to comprehend the real structure of the higher part of the valley of Ohio. Nothing indeed but real admeasurement could render credible, that the Allegany river should have part of its source within five miles from the margin of lake Erie, and after winding from thence 200 miles, receive a large southern branch, and be still 265 feet above the surface of the lake. In fact, the Ohio does not sink to the level of lake Erie before having flowed as low down as the vicinity of Marietta, and the mouth of Muskingum.

Another feature in the Ohio valley, is in a peculiar manner interesting; that is, the real slope of its surface. At a first glance upon the map, it would be naturally supposed that from the sources of Allegany and Monongahela, the plain would depress towards the final recipient, the Mississippi; but such is, however, not the fact. It is well known that, during the continuance of spring floods, loaded boats of considerable size can be navigated from the rapids of Ohio at Louisville, by the Ohio, Mississippi, and Illinois rivers into lake Michigan, and to the head of Niagara falls, without meeting a single rapid: whilst the direct line between the two extremes passes over an elevated ridge.

We have found the surface of the Mississippi at the mouth of the Ohio, elevated 321 feet above the Gulf of Mexico. Lake Michigan is about 35 feet higher than lake Erie, or 600 feet above the Atlantic seas. In most parts of its course, Illinois river has much more the aspect of a winding canal than that of a river in the true meaning of the latter term, there being only 279 feet fall from the level of lake Michigan to the mouth of the Ohio, in a distance of 520 miles, following the meanders of the rivers; or, a small fraction above six inches per mile. These elements demonstrate that no part of Illinois river is as high as the bottom of Ohio at the mouth of Sciota, and only near the vicinity of Cincinnati do the two rivers come on the same level; that the great original plain sloped from the Appalachian system towards the Illinois river and Michigan lake; and that the Ohio traverses the declination of the intermediate space obliquely.

As a navigable section of the United States, the valley of Ohio has some peculiar features. The Ohio itself, and its principal source, the Allegany, are in a striking manner gentle as respects current, and from Hamilton in Cataraugus county, New York, to the Mississippi, over a distance of 1158 miles following the streams, at a moderately high flood, meets, except the Rapids at Louisville, with not a single serious natural impediment. The Monongahela, more impetuous than the Allegany, is yet navigable, without falls or rapids, by both branches, far into Virginia. Descending the valley, the two largest confluent from the south-east, the great Kenhawa and Tennessee, rise, by interlocking sources, in Ashe county, North Carolina, and flowing in directly opposite courses, each reaches its recipient, the Ohio, by an immense curve, which taken together, sweeps round the rivers of Kentucky, and some of those of Virginia and Tennessee. Rising on the highest Appalachian table land of the United

States, at an elevation of at least 2000 feet, the currents of both Tennessee and Kenhawa are extremely rapid; the latter impeded by falls, and the former by rapids at the Muscle Shoals, but both navigable downwards from near their sources. Though scarcely reaching the spurs of the Appalachian system, the rivers of Kentucky, though generally without falls or rapids, have very strong currents arising from the great descent of their common slope.

On the north-west side of the valley, though from a different structure, the rivers are also extremely rapid. Rising on a table land, from 300 to 1000 feet above their mouths, and in no instance having a direct course of 300 miles, the streams, though falling gradually, are real torrents. The Big Beaver, Muskingum, and Hockhocking, have direct falls; but the Sciota, Miami, and Wabash, though excessively rapid, have neither falls nor cataracts to impede navigation.

Taken under one sphere of vision, the Ohio valley may be regarded as a great plain inclining from the Appalachian system to the N. W., and obliquely and deeply cut by the Ohio and its numerous confluent, into chasms from 460 to nearly the level of the streams. In the higher part of the valley, when on the rivers, the banks, with the exception of comparatively narrow flats, near the margins, rise by bold acclivities into hills which have a mountainous aspect. This boldness of outline imperceptibly softens descending the Ohio, and, approaching the Mississippi, a monotonous ring of level woodland bounds the horizon. Ascending the rivers of the south-east slope, the scenery becomes more and more rugged, until terminating in the ridges of the Appalachian chains: on the contrary, if the rivers of the north-west slope are ascended, we find the landscape broken and varied near the Ohio, but around their sources flat and monotonous.

The soil, climate, and vegetable productions

Ohio valley are in a remarkable manner diverse. The soil, taken generally, may be considered fertile, but with many places presenting strong exceptions. The level calcareous formation in Kentucky, and the wide spread plains of Ohio, Indiana, and Tennessee, present extensive tracts where spring-water is scarce, and wells of very difficult construction. Wherever the face of the earth in this valley is broken into mountain, hill, or dale, excellent fountain water abounds. The south-eastern part of the valley, bounded north by the sources of the Allegany to those entering Tennessee from Alabama, and from lat. $34^{\circ} 15'$ to $42^{\circ} 30'$, is, following a direct line north-east and south-west, 750 miles. From this region, the rivers flow from mountain or very hilly sources by deep and precipitous channels, and it may be remarked, that from the Monongahela to the Tennessee inclusive, whatever may be their courses near their sources, the rivers enter the Ohio in a direction of a little W. of N. From the head of Allegany to the extreme southern bend of Tennessee, both soil and climate, through eight degrees of latitude, present an aspect extremely varied. Natural and exotic vegetables are also in a very remarkable manner generically and specifically diverse; wheat and cotton mingle in the southern extreme, and scarce a single useful plant known in Europe or America, suitable to the climate, but finds a genial soil on this region. There are few timber trees known on the continent from N. lat. 34° to 43° but what may be found on the streams and hills from Alabama to New York. The most valuable and prominent are ten or twelve species of oak, at least half as many species of pine, and hickory; three or four species of maple, one of which, the sugar maple, is of incalculable value; the liriodendron here rises to its utmost majesty, if not mass, and may be called the *pride of the western forest*; towards New York the *hemlock* rivals the liriodendron in height, if not in

elegance. Beside those enumerated, the ash, elm, linden, and an immense number of more humble trees, shrubs, and vines, vegetate luxuriantly.

It is along the western spurs of the Appalachian system, that advancing from the shores of the Atlantic to the west, we first find the earth extensively abounding in water, holding more or less muriate of soda (common salt) in solution. It is a truly remarkable fact, that extending a line from Onondaga in New York, into Louisiana, with a slight elliptical curve towards the Appalachian system, salt water has been found wherever the earth has been penetrated to any considerable depth, and in many places breaks out to the day in natural springs. Works for the extraction of the mineral from the fluid solvent, exist from Onondaga to within 8 miles from Natchitoches. Iron might also be named as the product of the region under review, but that most important of all metallic ores abounds so much in numerous other places, that happily no one large section of the United States, can, in respect to its production, claim precedence.

Next to salt and iron, the south-eastern slope of the Ohio valley, particularly to the north-eastward, exposes to open day immeasurable strata of bituminous coal, thus combining three of the most indispensably useful minerals—salt, iron, and coal—and each in quantities which seem to increase with discovery and defy exhaustion.

Differing in aspect from the range we have been surveying, the south-western slope of Ohio valley is, from the greater monotony of its surface, much less productive of mineral treasures, and much less diversified in its vegetable species. On similar latitudes, but trifling difference of climate is perceptible, height and exposure being nearly alike, North-west from Ohio river iron is found, but not extensively bituminous coal is plentiful along and near Ohio river; and some slight indications of salt and gypsum

occur; but the interior rising and spreading an immense table land, minerals, if they exist, must lie deep, and consequently elude ordinary means of discovery.

Taken as a whole, though the Ohio valley combines numerous advantages, it has been comparatively too highly coloured. The soil on either side of the Ohio river is very far from uniform. In most essential circumstances, as respects natural phenomena, and human economy, strong analogies exist between the contiguous parts of the two sections of Ohio valley, whilst their extremes present a complete contrast. It has been an error with travellers who merely passed along and near Ohio river, to represent the Ohio valley as a country fertile, pleasing, and inviting, but of uniform physiognomy; but so far, however, from its being so in fact, it would be very difficult to find any other equal extent of the earth, where natural features are more strongly contrasted; where is every species of surface from the rugged mountain precipice to plains scarce more inclined than the surface of an ocean in a calm; where forests almost impenetrably dense, are followed by naked prairies; and where rivers flow with every degree of rapidity, from perceptible motion to the violence of a cataract; and, in fine, where exists almost every diversity of soil, from the exuberantly fertile alluvion, to the utmost extent of sterility.

By turning to table 20, it will be seen that the valley of Mississippi proper above the Missouri, is not so extensive as that of Ohio. The greatest length of the former is from the sources of the Mississippi river to the junction of that stream with the Missouri, 750 miles, and its greatest breadth, from the sources of Ouisconsin to those of Lemoine river, 350 miles.

In our survey of the Ohio valley, we have reached the verge of those wide spread prairies, savannahs,

or steppes, which more westward dilate until forests dwindle to mere clumps or narrow lines along the streams, and in the intermediate spaces extend grassy wastes, which seem to lengthen as the traveler speeds over their monotonous surface. It has already been noticed in this view, that in its natural state, an almost unbroken forest spread over and around the Appalachian system of mountains, reaching to the Atlantic ocean, Gulf of Mexico, and stretching over St. Lawrence towards Hudson's bay, and westward beyond the Mississippi and Ohio. This is, perhaps, the most extensive continuous forest which exists on earth. The human hand has, indeed, marked its surface by opening a few spots, but the far greater part remains the empire of trees. Beyond this wooded region, to the west, follows another, far more extensive, but of very different character. The second or grassy tract is not separated from the wooded by any definite limit; in passing from one to the other, the features are so blended as to render the transition imperceptible.

In general, the prairie region is less hilly, mountainous, or rocky than that of the forest; but exceptions in both cases are frequent. Plains of great extent do exist in the latter, and mountains of great elevation, mass, and extent, chequer the former section.

From the local features of the country from which its sources are derived, the real extreme head of the Mississippi continues doubtful. According to Tanner's Map of North America, this river rises at N. lat. $48^{\circ}36'$, W. lon. 18° , interlocking sources with Red river branch of Assiniboin and with the western sources of lake Superior, and, pursuing a course of S.S.E. joins the Missouri at N. lat. $38^{\circ}56'$, having traversed a small fraction above $9\frac{1}{2}$ degrees of latitude. The actual length of the Mississippi is still less accurately known than the position of its source. Like other central riv-

of the United States, the length of the Mississippi has no doubt been overrated. Compared on good maps, no essential difference in length appears between the Ohio and Mississippi, when Allegany is added to the former. In this manner Ohio measures very near 1200 miles, and no serious error will, I am persuaded, arise from assigning a similar length to the Mississippi.

From the right bank the Mississippi receives, advancing from source to mouth, Leech-lake river, Vermillion, Pine, Corbeau (crow river), Elk and Sac, above the Falls of St. Anthony; below the latter point are the confluent, St. Peters, Upper Iowa, Little Maquaquetois, Galepa, Great Maquaquetois, Lower Iowa, and Lemoine. From the left in descending, enter Thornberry, Round-lake, Turtle, Portage, Chevreuil, Prairie, Trout, Sandy-lake, St. Francis, and Rum rivers, above St. Anthony's Falls; and below that cataract St. Croix, Chippeway, Black, Prairie, le Crosse, Ouisconsin, Sissinawa, Riviere au Fevre, Rock, Henderson, and Illinois. The confluent of the Mississippi, are given in great part on the respectable authority of Mr. Schoolcraft, who estimates the elevation of the sources of that stream at 1330 feet. From comparative length of course, with the Ohio, and from other data, the statement of Mr. Schoolcraft approaches, it is probable, very near the real elevation of that marshy table land, which gives source to the southern branch of Assiniboin, and to the Mississippi.

The Ohio, in its north-eastern and extreme sources, we have found issuing from an elevated, mountainous, and highly variegated country; those of the Mississippi, on the contrary, ooze from an immense marshy plain, in great part devoid of timber. The intervening space between lake Superior, and the great inflection of Missouri at the Mandan villages, rises by a rapid acclivity to near

700 feet above the lake, and thence spreads towards the Missouri in a level with very little declination from the horizon. From the preceding features, the sources of the Mississippi have great resemblance to those of the Miami, Sciota, and Wabash branches of Ohio. It is indeed a circumstance peculiar to the Mississippi, that the physiognomy of nature around its head and estuary bear so strong resemblance. A difference of 19 degrees of latitude precludes much resemblance in vegetable or stationary animal production; but according to Mr. Schoolcraft, who visited the sources in the month of July, the migratory water fowl found there at that time of the year, are very nearly specifically the same, which flock in countless millions over the Delta, in December, January, February and March. "It is also deserving of remark," says Mr. Schoolcraft, "that its sources lie in a region of almost continual winter, while it enters the ocean under the latitude of perpetual verdure."

On a view of the particular valley of the Mississippi, its general monotony first strikes the eye. No chains or groups of mountains, or elevated ranges of hills, rise to vary the perspective. Over so wide a space as 180,000 square miles, some solitary elevations do exist, which for want of contrast are dignified by the name of mountains; but few continuous tracts of equal extent, afford so little diversity of surface.

The Mississippi itself is traversed by numerous falls of humble perpendicular descent; such is Pegagama, about mid-way between Sandy and Winnepec lakes, at N. lat. $47^{\circ} 30'$; the Little Falls at N. lat. 46° ; Big Falls below the mouth of Sac river; and those of St. Anthony at N. lat. 45° , immediately above the mouth of St. Peter's river. Many places along the banks of Mississippi are high, broken, and precipitous; but taken as a whole, there is a sameness which strikingly contrasts with the ever vary-

ing landscapes, along the higher part of the Ohio, and upon the Appalachian streams.

Extending through 9 degrees of latitude, the change of climate in the Mississippi basin is very considerable, and the extremes of temperature are again augmented by a difference of level of upwards of one thousand feet, or an equivalent to at least 2 degrees of latitude. It has been already shewn, that the temperature of similar latitudes and heights, lowers advancing westward on the continent of North America, and this phenomenon is very apparent in passing from the valley of Ohio to that of the Mississippi. In point of climate and soil, and, lead excepted, mineral production, the latter valley is very inferior to the former. Vegetables on similar latitudes, either indigenous or exotic, do not very materially differ specifically on the two valleys. Near the source of the Mississippi, the prevalent timber is composed of pine, spruce, cedar, maple, and white birch. Timber is, however, comparatively scarce on this valley, as so much surface is occupied by prairie, or lakes; extensive lines of alluvial soil of great fertility, border the streams, particularly the Mississippi itself and Illinois, but in no near proportion to the same species of soil in the valley of Ohio.

A species of cerealia, the *Zizania aquatica*, or as it is usually called, Wild Rice, is found over perhaps 3,000,000 square miles in N. America, but has not yet been cultivated as a domestic grain. This grass abounds around the lakes and higher streams of the Mississippi, and constitutes a considerable part of the food of the native Indians. It would be a service done to the human species, if some person suitably situated would bring the *Zizania aquatica*, to the test of experiment, and determine whether cultivation would not develop the seed of this vegetable, as it has done with other cerealia, such as wheat, rye, oats, barley, rice, and maize. If

such an-experiment would lead to a favourable result, immense regions of interior N. America, would admit dense population, which without such a grain must continue desolate.

Missouri, including Osage, Kansas, and Platte valleys, would follow in natural order of position the vallies of Ohio and Mississippi, but from priority of civilized settlement, and the organization of state and territory, I have concluded to give a preference to the lower valley of Mississippi, with the vallies of Red, Arkansas and White rivers. The greatest length of the lower Mississippi valley extends about 1200 miles in a direction from northwest to southeast, having the source of the Arkansas and the mouth of Red river as extreme points; reaching from N. lat. 29° to 42° , and without estimating mountain ridges or peaks, differing in relative elevation at least 5000 feet. If we add the actual difference of latitude, 13 degrees, to an allowance of 10 degrees for relative elevation, the climate at the northwest extreme must differ from that of the Delta 23 degrees in temperature, and render the seasons at the head of Arkansas, as severe as those in N. lat. 52° on the Atlantic coast of Labrador.

From the influx of Missouri, to that of Ohio, the volume of the Mississippi rolls, by a general S. S. E. course of 140, but by its windings 190 miles; but on receiving the Ohio, the main recipient inflects to a course of S. S. W. which it pursues 250 miles by direct course, but 380 following the bends, to the influx of White and Arkansas rivers. Turning thence to a very little W. of S. crosses three degrees of latitude or 210 miles in a direct line, but with the sinuosities of the river 360 miles, to the influx of Red river, and $1\frac{1}{2}$ miles below the outlet of Atchafalaya. Below the latter point the Mississippi once more inflects its general course, and bends to S. E., in which direction it continues by direct line 220,

but by the windings of the stream 335 miles, to its final discharge into the Gulf of Mexico.

The preceding elements give to the Mississippi below Missouri, a comparative course of 820, and an absolute length following the meanders of 1265 miles.

Into this main volume as a recipient are poured from the north-west, St. Francis, White, Arkansas, and Red rivers; and from the south-east, from the mouth of the Ohio, Obion, Forked Deer, Big Hatche, Loosahatchie, Yazoo, Big Black, and Homochitto, with some other streams of lesser note.

In no other circumstance is the physical geography of any part of the United States more remarkable, than in the prodigious inequality of the two opposing planes, down which are poured the confluents of the Mississippi below the influx of the Ohio. The western inclined plane, falling from the Chipewayan, sweeps over upwards of eight hundred miles, whilst the eastern, sloping from Tennessee and Mississippi, does not average a mean width of one hundred miles. The rivers which drain the two slopes are in respective length of course, proportionate to the extent of their planes of descent; whilst Red river exceeds a comparative course of 800, the Arkansas of 1000, and White river of 400, the longest stream from the opposite slope falls short of 200 miles. The alluvion brought down by such volumes as those of White, Arkansas, and Red rivers, explains satisfactorily, the reason why the Mississippi infringes so often on the eastern, and no where below the Ohio touches the western bluffs.

The lower valley of the Mississippi, is the most variegated section of the United States. Every form of landscape, every trait of natural physiognomy, and an exhaustless quantity, with an illimitable specific diversity of vegetable and metallic production, are found upon this extensive region. Flanked on the east by a dense forest, and on the west by the

naked ridges and spines of the Chippewayan, the deep entangled woods of the Mississippi, are set in relief, against the expansive prairies of Arkansas and Red river. The marshes of the Delta scarcely rising above the Gulf of Mexico, form one extreme, upon which, wherever the soil is arable, rise the orange tree and sugar cane, with many other vegetables, reminding the traveller that he is on the verge of a tropical zone ; on the other hand, the Arkansas is seen to draw its impetuous sources from the cold and sterile plains and vales of the Chippewayan. In the Delta, we behold the fierce but sluggish alligator watching for his prey, whilst on the mountain streams of the north west, we behold the argali, the antelope, wild deer and buffaloe, breathing and bounding in native freedom.

It is here also, that man himself experiences the utmost extremes of health and disease ; it is here in ranging from one limit to the other, he trembles and dreads to encounter sickness and death in the Delta, but feels the utmost pleasure of healthful animation on the wide spread, elevated and dry plains of Arkansas and Texas. It is here, that even now are seen the utmost contrasts that civilized modes of life can assume. In New Orleans and its vicinity, splendor, luxury, and indolence, superinduced by the climate, and fostered by wealth, and I might say by literature, where action is pain unless stimulated by pleasure, are followed in western Louisiana and in Texas, by the infinitely more animated, dare I say infinitely more happy life of the pastoral horseman. Free as the plains over which they roam, and nerved by an air of unequalled purity, these ever active sons of the chase, know no luxury beyond their herds, nor sigh for any distinction but that of mounting and managing their steeds with most adroitness. They are the Tartars of North America. The mind cannot but dwell upon the physical similitude between the desert steppes of cent

Asia and these interior prairies, and the still stronger resemblance which does and ever must continue to exist between the inhabitants of those distant regions.

If the minor parts of this great natural section of the Mississippi basin are reviewed in detail, the most prominent object is the Arkansas. If the Missouri is viewed as the first in magnitude amongst the confluent of the Mississippi, the second rank is due to the Arkansas, it being longer, and draining more surface than either the Ohio, Mississippi proper, or Platte. The actual remote sources of the Arkansas remain unknown, but must extend to near N. lat. 42° , and lon. 34° W., and entering the Mississippi at $33^{\circ} 56'$, and lon. $14^{\circ} 10'$ W., passes over 8° of lat. and 20° of lon. with a comparative course of 1400, and following its bends a length of at least 2000 miles. This really great river is navigable about 600 miles, but issuing from an elevated and mountainous region, its main volume and numerous branches are much impeded by shoals and cataracts; but below the mouth of Canadian Fork, though passing through a minor chain of mountains, the Arkansas rolls its stream of about 600 yards wide, with great depth, to the Mississippi.

Next in the volume and length of course to the Arkansas is Red river, which like its rival flows from hidden fountains in the mountains of Santa Fe. If the information given by Major Long be correct, and it is entitled to great credit, Red river rises from N. lat. 32° to 35° , and from 25° to 28° W. By comparative courses this stream flows over about 1000, but by its meanders exceeds in length 1500 miles.

Both Arkansas and Red rivers have their periodical annual swell, and enter their recipient in seasons of flood, with immense volumes, which contribute largely to that enormous mass of water which every spring flows over Louisiana into the

Gulf of Mexico. Impregnated by saline particles and coloured by ochreous earth, the waters of these two rivers are at once brackish and nauseous to the taste, particularly near their mouths; that of Red river so much so, that at Nachitoches at low water it cannot be used even for culinary purposes.

White river entering from the same side; 20 miles above Arkansas, though humble when compared with Arkansas and Red rivers, is nevertheless a stream of considerable magnitude, draining the space between the Arkansas, Osage, Missouri, Mississippi and St. Francis rivers. With an entire comparative course of 400 miles, White river by its numerous branches, waters a fine tract of country nearly equally divided between the state of Missouri and the territory of Arkansas.

St. Francis and Merrimac, the first entering the Mississippi 36 miles below the mouth of Missouri, and the second 287 miles following the bends below the mouth of Ohio, are both fine streams, though humble when compared with the lengthened Arkansas and Red rivers, or even White river, but gaining consequence as flowing from the lead district of Missouri, and from affording navigable channels from fertile and improving districts of country.

St. Francis rises in Madison, Washington and St. Francis counties, Missouri, by numerous branches which pursue a general course S. E. 60 miles, winds then S. and S. S. W., forms in that direction for about 35 miles part of the boundary between Missouri and Arkansas, enters the latter, and continuing S. W., falls into the Mississippi at $34^{\circ} 33'$ N. lat. 7 miles below the mouth of Ohio, after a comparative course of 250 miles.

The Merrimac derives great part of its consequence from rising in the mine district, Washington county, Missouri, between the sources of St. Francis and Gasconade, from which it flows by comparative courses 100 miles, and enters Missouri 18 miles below St. Louis.

The small rivers of the eastern slope, the Obion, Forked Deer, the two Hatches, Wolf, Yazoo, Big Black and Homochitto, have nothing to merit particular notice in so brief a view.

The Mississippi proper, being first discovered, has by prescription, given name to the basin, though the Missouri and its confluent drain nearly one half the entire surface. In our survey of the Ohio, Mississippi proper, and the lower confluent of that stream, we have been slowly emerging from the Appalachian woods, and opening our way to the interminable plains of the Chippewayan. Reaching the thousand streams of the Missouri, wastes of grass and thorny opuntia, mock the eye and defy the toil of the traveller.


Missouri rises, in what is with unparalleled absurdity called Rocky Mountains, a part of the great Chippewayan system. The stream called by pre-eminence Missouri, is not the main branch, if our maps are even in a tolerable manner correct. The Yellow Stone river is longer than its rival above their junction, and receives also larger and longer confluent. Assuming, however, as the sources of Missouri, Madison's and Jefferson's rivers, that great stream rises at N. lat. 44° , lon. 30° W. The general course for about 120 miles is N. E. receiving in that distance several tributary streams; thence turns N. 120 miles, and about N. lat. $46^{\circ} 20'$ is augmented by Dearborne's river from the N. W. It thence curves N. E. 80 miles, to the influx of Maria's river from the N. W., and turning east 150, and thence north east 150, joins the Yellow Stone river from the south west.

The Yellow Stone river rises in the Chippewayan at N. lat. 42° , lon. 30° W. and flowing thence by comparative courses about 800 miles, unites with the Missouri at N. lat. $48^{\circ} 10'$, lon. $24^{\circ} 20'$ W., and is evidently the main branch. Estimated however, *by either branch,* and by the windings of the

reams, the Missouri has here flowed above the mouth of Yellow Stone river upwards of 1000 miles, and drained at least 150,000 square miles. Its volume is here perhaps but little, if any, less wide or deeper than at the junction with the Mississippi. A few miles below the influx of the Yellow Stone, the Missouri has reached its utmost northern bend 48° ; and curves by a regular sweep of 200 miles to the Mandan villages. It is along the intermediate space from the Yellow Stone to the Mandan towns, that on the left side many of the sources of Assiniboine rise, within from 1 to 5 miles from the margin of Missouri. Immediately above the Mandan villages, this now large river, assumes a general northern course over $4\frac{1}{2}$ degrees of lat. or 300 miles, receiving from the left only a few unimportant creeks, but from the right, Cannon Ball, Wetarhoo, Warcarna, Chayenne, Teton and White rivers. Now the influx of White river, the Missouri enters to a general but very winding course of S. E. 200 miles to its junction with Platte; and thence E. 200 miles to the influx of Kansas river.

The Platte and Kansas are two great confluent rivers in the Chippewayan, and flowing, by comparative courses, generally to the eastward, the former runs 600 miles. The Kansas joins its parent on the western boundary of the state of Nebraska, N. lat. $39^{\circ} 05'$, long. $17^{\circ} 31' W$. Receiving the Arkansas, and entering the state of Missouri, the river inflects to a little S. of E. 250 miles to its junction with the Mississippi, after an entire comparative course of 1870, but by the meanders at 1000 miles.

It may be observed, by reference to a map of that part of the United States, that the confluent rivers of Missouri, of any considerable length, are all from the west, and that those from the left, below Yellow Stone, with the single exception of Jacques River, whose course comparatively falling short of



250, and very few amounting to 100 miles. Below the Kansas, from the right, the only rivers demanding particular notice are the Osage and Gasconade; the former a stream issuing in the plains between Grand river branch of the Arkansas and the Kansas, and flowing by comparative courses 300 miles, in a direction of N. E. by E., joining the Missouri at very near the centre of the state of the same name, N. lat. $38^{\circ} 32'$, long. $14^{\circ} 50' W$.

The Gasconade is a small, but from its position an important stream, rising in the southern part of Missouri, between the sources of White and Osage rivers, flowing by comparative courses 120 miles, in a direction a little E. of N., and falling into Missouri river in the county of Gasconade.

The preceding account of the Missouri and its confluent is, from the state of our geographical knowledge, very general. As high as the Mandan villages, Lewis and Clarke, Stoddard, Brackenridge, Bradbury, and others have given tolerable ample notices of the main stream; but with all that has yet been published a feeble and uncertain light has been thrown on these immense regions.

The greatest length of the valley of Missouri extends from the mouth of that stream to the head of Maria's river 1200 miles, its greatest breadth from the sources of the Platte, to a short distance southeast from the Mandan villages, 700 miles, with an area of 523,000 square miles; equal to 334,000,000 of statute acres.

If we imagine this vast space engrasped by one sweep of vision, three remarkable features must command pre-eminence; first, the turbid character of the water; secondly, the very unequal volumes of the right and left confluent; and thirdly, the immensity of the open prairies over the river lines of forest. In the direction of the rivers, the inclined plain of Missouri exceeds 800 miles from the valleys of the Chippewayan, and rather more than that

distance from S. to N. from the southern branches of Kansas to the extreme heads of the northern confluent of the valley. Ascending from the lower verge of this widely extended plain, wood becomes more and more scarce, until one naked surface spreads on all sides. Even the ridges and chains of the Chippewayan partake of these traits of desolation. The traveller, who has read the descriptions of central Asia, by Tooke or Pallas, will feel, on the higher branches of Missouri, a resemblance at once striking and appalling. He will feel and regret how much of the earth's surface is doomed to irremediable silence, and he will acknowledge, if near the Chippewayan in winter, that the utmost intensity of frost over Siberia and Mongolia has its full counterpart in North America, on similar if not on lower latitudes.

If those of the Yellow Stone are included, the sources of Missouri rise along the Chippewayan through eight degrees of latitude, or near 600 miles, and it is very worthy of notice that the far largest tributaries rise in comparatively a southern and flow north-east to a northern latitude, and that the main volume has actually flowed 1300 miles before it regains the latitude of the extreme southern sources of Yellow Stone river.

But of all the characteristics which distinguish the Missouri and its confluent, the few direct falls or even rapids is certainly the most remarkable. Between Dearborne's and Maria's rivers the Missouri leaves the Chippewayan, by rolling over ledges of rock for a distance of 18 miles; after which this overwhelming mass of water, though every where flowing with great rapidity, nowhere swells into a lake, or rolls over a single cataract in a distance of at least 3500 miles to the Gulf of Mexico. If, therefore, the Amazon is excepted, the Missouri and its continuation the Mississippi afford the most extended uninterrupted line of river navigation which has ever been discovered.

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of vision, three remarkable features must not be forgotten: first, the turbid character of the water; secondly, the very unequal volumes of the main and tributary rivers; and thirdly, the flatness of the prairies over the river lines. In the direction of the river, the inclined Missouri extends 800 miles from the valley of the Chippewagon, and rather more than that

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GEOGRAPHICAL VIEW.

Mississippi proper flowing so nearly north, spring thaws commence near the mouth, and the discharge is gradual. Similar remarks so to the Ohio and Arkansas, and thus moderate the quantity in time of water on the Delta.

In common years, Red river flows out in February in March, but occasionally continues in December until late in the ensuing spring. At flood from Arkansas, Ohio, and Mississippi commences generally early in March, and attains its full height on the Delta about the middle; abating from the latter period, has subsided by the end of July or beginning of August, when the retarded overflow of Missouri is by its arrival the annual inundation.

Though the period of flood is well known to the inhabitants of the Delta, and in common years can be dated within a few days, such is, however, the variability of the seasons over the whole basin, that length of experience gives any probable indication of the quantity or elevation. In 1800, and the waters of the Mississippi did not attain to the height of the banks.

In the geographical sketch which immediately follows this chapter, at page 296, it may be seen that the Delta commences with the efflux of the Atchafalaya on the right, but on the left with the Iberville. In both cases the surplus discharged from the main stream never returns but is conveyed on one side into the Atchafalaya and other recipients, and on the other into the Iberville, Borgne, and Chandeleur bay. Connected with the general inundation is the very old but general opinion that the Mississippi rises and does occasionally change its bed, and flows on a comparative ridge. The bed of the Mississippi, like that of all other rivers, is the

lowest depression of the country through which it flows. As high as the efflux of La Fourche the stream is 130 feet deep at low water, and at a similar state 75 or 80 at Natchez. At New Orleans the depth exceeds 100 feet. From the immediate margin of this great mass of water the country falls by a very slow depression, and the bottom of the deepest lakes, Pontchartrain, Maurepas, Quacha, Chetimaches, and others, vary from 4 or 5 to 18 or 20 feet below the general level of the Delta, leaving the bottom of the Mississippi upwards of 100 feet below that of Pontchartrain, or any other lake of Louisiana, except those formed in the following manner.

The sweeping bends of the Mississippi cause the volume of its water to recurve upon itself, and by the double abrasion on its opposite side a neck or isthmus is cut through, and thus far a new channel formed, and the ancient bend, though assuming the aspect of a lake, still attests its origin by its proximity, great depth, and perfect resemblance to the bends of the parent stream. Of the latter species of lakes, *Fausse Riviere*, *Homochitta*, and *Yazoo*, were produced within the range of history; those of *Concordia*, *St. John's*, *St. Joseph's*, *Providence*, and *Grand lakes*, were found in their existing state when Louisiana was colonized by the French. With the exceptions I have stated, the Mississippi can no more recede from its channel than could the Hudson, Delaware, or Susquehannah; the barriers which confine the latter to their channels are more prominent, but not less irremovable or impenetrable, than is the extended alluvion which spreads from the former river,

GRAPHICAL VIEW.

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assumes a S. W. course 200 miles; receives at N. lat. $46^{\circ} 10'$, Lewis' river from the N. E., and at about N. lat. 46° turns to the W., which course it maintains 300 miles to its egress into the Pacific ocean at N. lat. $46^{\circ} 15'$, long. $47^{\circ} 53' W.$

On the eastern side of the western system of mountains, the Columbia receives the Multnomah, a large branch from the S. or S. E. The latter, except for perhaps 100 miles above its mouth, remains unexplored, but from its breadth and volume evinces a remote source, which remains yet to trace.

The extreme northern sources of Columbia interlock with those of Saskashawan, perhaps with those of Unjiga, or Peace river. Clark's river rises by numerous branches in the Chippewayan mountains, interlocking sources with those of Missouri, and Saskashawin; the extreme southern sources rise at N. lat. 45° , and long. $34^{\circ} 36' W.$; flowing thence first nearly due north, but gradually curving to S. W. joins the Columbia after a comparative course of upwards of five hundred miles.

Lewis' river rises at N. lat. 40° , lon. $30^{\circ} W.$ interlocking sources with those of Arkansaw, Platte and Yellow Stone rivers; pursues thence a general N. W. course of 650 miles, receives a large tributary, the Kooskooskee river, from the east, turns to the W. and unites with the Columbia after a comparative course of 800 miles. If not superceded by the Multnomah from future discovery, Lewis' river is the main constituent branch of Columbia.

The Multnomah, as already observed, draws its waters from a *terra incognita*. Spanish travellers have discovered north from the Colorado of California, two rivers, the Rio de Buenaventura, and Rio San Clementina, flowing from the Chippewayan, but final discharge unknown. The most northerly, the San Clementina, the Timpanogos, or the Monogos of Tanner's North America, is by many supposed the extreme south-east source of Multnomah.

and if so, that branch of Columbia rises at N. lat. 41° , lon. 34° W. and must have a comparative course of upwards of seven hundred miles, and will, thus extended, compete for precedence with Lewis' river.

Those four great confluent, Columbia proper, Clark's river, Lewis' river and Multnomah form the very peculiar river of Oregon, which in length, if estimated by Columbia proper, exceeds 1000, by Clark's river 1000, by Lewis' river perhaps 1100, and by the Multnomah at least 900 miles. In relative height the surface of the Oregon basin falls from the plateau of the Chippewayan, at least 3370 feet, to the level of the Pacific ocean. Down this rapid descent the rivers are precipitated over numerous falls and cataracts. The tide penetrates inland through the western system of mountains, and following the windings of the stream upwards of 100 miles. The bay at the mouth opening between capes Adams on the S. E. and Disappointment on the N. W. The entrance with about 26 feet water, is easterly about 20, and thence south-easterly to the mouth of Multnomah, sustaining thus far a depth of at least 20 feet.

The face of the Oregon basin as far as explored is far from promising. Much of the country is broken by mountains or stretches in naked plains. Some fine vallies though of confined extent spread between the chains, and in respect to climate the Oregon territory possesses a decided advantage over that of similar latitudes on the Atlantic coast, to the amount of perhaps 5 or 6 degrees of latitude. See *Chapter X. on Climate*. An isothermal line drawn from the mouth of Columbia would incline rapidly to the south-east, in rising to the plateau of Chippewayan, and allowing that plateau 3870 feet elevation, the line of equal heat would reach N. lat. $37^{\circ} 50'$, supposing 400 feet elevation equal to a degree of latitude; and waving from the summits of the Chippewayan towards the Atlantic, would in a

place again inflect as high as its point of outset from the Pacific coast.

From this melioration of temperature, the territory of Oregon, every thing else being equal, will be more habitable than similar latitudes on the Atlantic coast of the United States; and the Columbia much more accessible in winter, than the rivers and havens of Canada, New Brunswick, Nova Scotia and Maine, or in fact even those of the Atlantic coast generally, as low as the Delaware. By reference to the comparative tables of mean heat on the opposing sides of the Atlantic Ocean, it will be seen that advancing from N. lat. 30° towards the northern pole, the line of equal temperature inclines to N. E. and S. W. from a small fraction above 0 to $14\frac{1}{2}$ degrees, giving to the coast of Maine a climate not materially different from that of Norway, in N. lat. 60° . But mere mean temperature gives a very inadequate idea of the respective climates on the eastern and western sides of the two continents. The moisture of winter on western coasts, leaves rivers open much higher, than could be expected from any data afforded by the thermometer.

The remote region of Oregon, appears at present as if on another planet. From the elements in table 10, page 76, it appears that a line drawn from Cape Hatteras to the mouth of Columbia river, would measure 2702 statute miles, and that the middle point on such a line, would be found in the valley of Missouri, 200 miles N. $73^{\circ} 34'$ W. from the Council Bluffs. The immensity of the territory of the United States may be faintly conceived by the fact, that St. Louis on the Mississippi, is not one third of the distance from Cape Hatteras to the mouth of Columbia, and that if the whole surface was inhabited and subdivided into organised states, the capital, if central, would stand upwards of 600 miles in a direct line N. W. from St. Louis. By any practica-

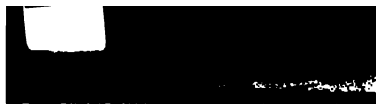
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If due attention is given to the inevitable of settlement and population, the mouth of presents an opening from the Pacific, or American emporium must rise. It is necessary to combine the philosophy of America to the relative physical position of West America, Polynesia, and south-eastern Asia some foresight of the destiny of Oregon.

We have now completed a rapid survey of a wide portion of the habitable earth, comprising the domain of the United States. As far as of "*The View*," and the existing geography would admit, we have sketched the general features of central North America; the mountains and interior plains have passed in review, and we proceed to an examination of the Meteorological phenomena, or a View of the Climate of the United States. Before, however, quitting the subject of our physical geography, I cannot but mention a large tract of unexplored territory which lies between the northern regions of Mexico, the west of the United States, and still more extensively in the north-eastern regions claimed by Russia. If we commence at 30°, and stretch to Behring's strait, we have a tract of 3000 miles in length, with a mean width of 600 miles, or an area of 1 800 000 square miles.



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